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ON THE COVER: Carl Sagan works his video magic. Photo by Eduardo Castaneda; composite by Michael Sullivan.

output

Compulsory Freedom

Within the pages of this magazine we allow for many differing ideas on routes to an improved future life. The more ideas explored, the more chances of reaching right solutions for tomorrow. But there are also a few fundamental principles which we consider to be *above question*.

One of those principles is *individual rights*: the rights of each individual to *own* his life—to choose the goals and the actions which will constitute his life.

Almost everyone will agree with that principle immediately; it's so self-evidently logical and moral. But the lip-service guys begin dropping by the wayside as soon as one starts defining all the *consequences* and *ramifications* of that principle.

One of the most controversial ramifications involves the military draft.

The draft operates on the principle that politicians know what is best for the country, and that their opinion matters more than the ideas of any individual. Therefore, at any time they deem necessary, the politicians can force an individual to leave his home and family, his career, whatever his life consists of and risk his very existence for whatever purpose *they* have decided is important. The politicians always attempt to get *voluntary cooperation first*, but if individuals don't go along with the cause, they can be imprisoned and fined.

In other words, the principle of the draft is that *it is all right to force someone at gun-point to defend himself*. That kind of contradiction is so obscene that one might think it would be proposed only by a madman or a monster.

Earlier this year President Carter proposed compulsory registration of 19- and 20-year-old males, and Congress voted it into law in June.

Carter didn't have the guts to call it a mandatory draft, however. Instead he named his plan a "registration" process, and when he signed the bill that made it law (conducted in a Rose Garden ceremony, as if it were a special occasion), the White House issued a deceptive little statement which muttered that the President had signed a House Resolution "which provides for a transfer of \$13,285,000 to the Selective Service System in 1980."

The White House *did not mention* that those funds had been appropriated by force from hard-working taxpayers in order to finance the system that would conscript their sons—to pay for TV advertising that uses guilt and patriotism to get youngsters into registration lines ("Not just because it's the law. But because it's the right thing to do."), and if that doesn't work, to buy the guns needed to arrest the kids, take them to court and pay the expenses of five-year imprisonments that can be imposed (on top of a \$10,000 fine) on any young man who, for whatever reasons, does not choose to register.

Either *individual rights* is a basic principle or it isn't! Principles are not something one supports only when it's convenient. Your life belongs to you—*period*. Your rights are not granted to you by the government; neither can they be rescinded by the government—no matter what the reason—even if the cause is *valid*.

I advocate that a young person should *volunteer* for the military provided he understands the issues involved and wants to defend his freedom and fight for his values. But that is a personal decision. I cannot advocate that people break the law, but I will not urge young men to register. That's the hideous dilemma our government puts us in: break the law and go to prison or willingly give up ownership of your own life by obediently doing what the politicians ask of you.

I cannot help but think of 1937-38 when Hitler called for registration of the German people. He asked all Jews to identify themselves (along with other "undesirable" minorities) and he asked that it be done voluntarily—with the assurance that this was an insignificant step toward a master plan that ultimately would create a better tomorrow for the country.

Looking back, it's easy to see the horror of that first small step, but we had better learn to identify when fundamental principles are *first* abridged or our own tomorrow could be turned into a holocaust.

Kerry O'Quinn/Publisher

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MOON TREATY

... I have enclosed a copy of a letter that I have sent to the President and I believe it expresses my views on the Moon Treaty. I hope that it is effective.

Mr. President:

The implications of the '79 Moon Treaty are enough to shock any American who has the facts of just what such a treaty would mean. We have sounded off to the world about our high ideals and about free enterprise for the individual. We try to stress this to our fellow nations and set a good example for them to follow.

Now we are expected to agree to a treaty that not only infringes on free enterprise and individual rights but will also remove the hope from the very people who are paying the bill. Our space program is in need of a boost now and it won't get any better by alienating the public even farther from it than they already are.

All the experts seem to agree to the fact that ultimately our energy will have to come from space where the sun's rays can be collected all the time. I also believe that very soon we'll have to think about space to help us with the growing problems of population and more food. As it ends up, our space program needs the total support of the people.

The '79 Moon Treaty as well as the '67 Outer Space Treaty both violate the very freedom our nation was founded on. This freedom was fought for many times in our past and may have to be fought for again in the future. Let's not add to that probability by agreeing to give up those freedoms.

Joel M. Hays
Key Largo, FL

MANIFEST DESTINIES

... I have been following the discussion concerning the UN Moon Treaty with great interest. My knowledge of the topic comes solely from American SF publications so I cannot claim to be an expert but I have noticed one interesting characteristic of much of the comment—the extremely negative attitude of most of the writers. Most seem to feel that the treaty is a deliberate attempt to deprive Americans of something that is rightfully and unquestionably theirs. Comments such as those from Messrs. Blaes and Wilkinson (FUTURE LIFE #20) seem to be based on some vision of the future in which colonization of space will be accomplished by a 21st century Daniel Boone who, armed with his trusty squirrel gun and Bible and accompanied by his dutiful wife and lusty children, will establish an independent homestead on the Sea of Tranquility: a rerun of Manifest Destiny, if you will.

Sorry folks, but I don't think it will happen like that.

First of all, the conditions of space are so radically different from those of 16th century America that the self-sufficient homesteader will never exist. Anyone going into space is going to be dependent on someone for something—food, air, transportation, supplies, etc. There are no Jovian Incas waiting to be pillaged of the gold that will pay for

the initial colonization efforts. The extremely sophisticated technology and skills required for space colonization will effectively keep the colonies tied to Earth for a very long time.

The second major obstacle to the "American Dream" concept of space development is the theory of private enterprise which apparently underlies the philosophy of Ms. Henson, et al. As a matter of practical logistics the only countries currently in the space race are Russia and the U.S.A. Leaving aside Russia's possible political, economic or military plans for the treaty, most of the people of the world will be faced with the dubious choice of becoming clients of either the Russians or the Americans. The negative aspects of the Russian system are obvious. But consider the alternative. If the American space program is indeed taken over by private enterprise, it will become the property of the huge conglomerates: Ford, ITT, and the oil companies, for instance. The prospect of being dependent upon the chicanery of ITT, the incompetence of Chrysler or the arrogance of Texaco is disquieting at best.

Also, as Canada has learned to its grief, the loyalty of the American multinationals and their subsidiaries is firmly fixed in the United States, and so are their profits. Very little sifts down to the local level. If space is taken over by the American free enterprise system, most of the people of the world will remain in their present position vis-a-vis the wealth of the world. They will be desperate beggars at the feast. Most have nothing to lose and possibly a good deal to gain from this treaty. They have certainly ceased to believe in the benevolence of capitalism. It is naive of Americans to be surprised by this development, and ridiculous of them to pretend that they have some kind of God-given right to skim the cream of the solar system as they have skimmed the cream of Terra.

D. Booker
Westlock, Alb., Canada

KILLER SATELLITES

... Do you really want to know why the public is no longer interested in the space program? How about NASA being unable to prevent the destruction of Skylab or predicting where it would fall? How about killer satellites? How about a space shuttle whose initial launch is postponed and postponed and postponed? How about the government's lack of interest in putting a man on Mars? If NASA wants public support, they're going to have to get their act together.

Kim L. Neidigh
San Antonio, TX

GROUNDING PROXMIRE

... Re: Carolyn Henson's column in FUTURE LIFE #20. She left out something more important than getting us into politics, and that's getting the ground-hogs out of politics. There are really only two ways of getting crap-heads like Senator Proxmire out of office; with ballots or bullets. I'd prefer to try ballots first. (It's hard to get FUTURE LIFE in the slam.) Maybe FL could organize (or at least begin) a voting block of SF and space supporters. Lest you think that too small a group, I would refer you to a recent U.T. survey, which shows that 25 percent of adults in the U.S. are fans of SF and that 18 percent of all voters are enthusiastic supporters of NASA. If only half of them voted, that's still nine million votes! That's more than enough to have swung any election in America's history. If that many people had changed votes in the '72 elections, McGovern would have been elected! (Now

there's a repulsive thought.) We can be even more effective on the local level. We could gain real power in the state legislatures, and control access to unexpired terms, in case someone does physically stamp out Proxmire (believe me, it's tempting).

William R. Carter Jr.
Greeneville, TN

FUTURE LIFE won't be organizing any voting blocks, but we've got the next best thing in this very issue: A guide to space activist groups in the U.S. Pro-spacers of every description will likely find at least one organization to join and support among the many space advocacy groups listed in the comprehensive survey which begins on page 20.

SPACE POTENTIAL

... As we all know there is a lot happening in the process of utilizing space potential. There are a lot of things going on at NASA and when I think of the next 20 years, yeah, I get excited. I think there should be a contemporary focus on NASA activities, i.e. comics, TV shows, cartoons, movies, etc. that center on the space shuttle and its crews. Also on what we could be doing now in space. Think about the future NASA personnel now at the tender ages of three through eight. These people have some very good role images to focus on with people like Rhea Seddon and Anna Fisher... you too girl!

Rory Duke Groner
Dobson, NC

CREDIT WHERE IT'S DUE



PHOTO GALE M. ADLER

In our *Galaxina* article in FUTURE LIFE #21, we omitted to credit the photos on pages 47 and 49 to photographer Gale M. Adler.

CURIOUS ABOUT DOLPHINS

... Regarding your interview with John Lilly, "Your God Isn't Big Enough," FUTURE LIFE #20: There is something that has always drawn humans to dolphins. Maybe it's the way they seem to smile. There is an ancient lure, they're so kind to us. They rescue us, they never hurt us. They have a sense of humor. But why bother to talk to them?

We're curious. What are they doing? What are they thinking? They've been around for 50 million

years with brains larger than ours.

Finally, we have the means for establishing interspecies communication thanks to Dr. Lilly and Project Janus.

Perhaps the dolphins will tell us what they know about survival. Maybe man was here before and didn't survive—but they did!

Thank you for bringing us up to date on Dr. Lilly's work.

Stephen A. Lilly
Miami, FL

HIGH ANXIETY

...I'd toast Norman Spinrad's "High Frontier" article (FUTURE LIFE #19) with three tokes off my pipe, but unfortunately the pigs have impounded my pipe.

That the U.S. spends billions to "protect" people like me from voluntarily indulging in certain recreational mutagens, while it doesn't spend doodly-squat to prevent companies like Hooker from making all of us involuntary consumers of their non-recreational mutagens, is a national disgrace.

Everyone has high and climbing levels of lead and various petrochemical derivatives (unfound in nature) in their bodies. This situation is becoming so alarming that I'm beginning to believe that we'll all be too brain-damaged to do anything about this problem by the time we take concerted action.

As part of the alleged vanguard of the future, the readers of FUTURE LIFE have a duty to do everything in their power to prevent Earth from becoming a toilet bowl by informing the public and their elected representatives of the alternatives to this form of mass suicide and the urgency of cleanup operations and stiff punishments for offenders.

Baybe Nono
Bellmore, NY

SPACE VEGETARIAN

...I feel an objective response to Carolyn Henson's article "Spaceburgers" (FUTURE LIFE #18) is needed, however brief. Like many non-vegetarians she writes on the subject of vegetarianism with a subjective and prejudiced state of mind. No doubt she has received many letters, but why choose, as representative, one so extreme and emotionally loaded as "potential human beings... cows and bunny rabbits"? And, once again, vegetarians are subtly ostracized by being called veggies.

It is acknowledged that due to limited space the early space station settlers, at least, would be vegetarian; but don't assume that when there are more (say, in a few hundred years) that humanity won't have a different moral and philosophical outlook and reject the slaughtering of animals for food. It is true of course that vegetable waste has to be recycled, but why the preoccupation with feeding animals? They are, in any case, terribly inefficient processors, e.g., animals eat 20 pounds of protein for every pound they yield as meat. Instead, why not mulch all the green stuff and use it as compost, thus enriching the soil for maximum nutrient content in the food? If it proves economical maybe any excess could be exported to Earth or other colonies.

Tony Pettingill
Klemzig, South Australia

LETTERS TO HARLAN

...Your works have been beneficial to me, being a

kidney patient on dialysis which causes one to be "angry" at the world. Your stories are like therapy—showing that others suffer too.

The purpose of this letter is that of educating the general public. Not to the sufferings of kidney disease, but to self respect to themselves and the human race.

It just irks me to see all types of human beings destroying their bodies. Now I'm no health food nut or anything like that—I'm talking about people getting stoned out of their gourds with booze, pills, weeds and any other substances which alter the reality of the world or how we perceive it. They suck smoke into their lungs and blow it out into other peoples' faces. They cram their faces with so much food that it has no place to go except around their bones. They take the magnificent machine that houses their unique human brain and pickle it just to escape the world.

Imagination... This is the key to preventing this degradation of homo sapiens. We are the only species capable of laughing, but we don't do it enough. Through science fiction stories, films, etc. the process can be renewed and distributed amongst these deteriorating humans on which our future survival depends.

David A. Green
Houston, TX

...I saw your first installment of "An Edge in My Voice" in FUTURE LIFE #20 and I started grumbling that I have another monthly magazine to pick up now (college students aren't allowed to touch money). My grumbling wasn't too severe. I do STARLOG as regularly as the Atomic Clock, but FUTURE LIFE is more mainstream than other genre magazines. And since I'm pushing myself out, bit by bit, of the solo science fiction junket I began more than ten years ago why not look into FUTURE LIFE. S.F. is still my personal favorite genre but I want to write, and the universe ain't the whole Universe. FUTURE LIFE appears to be a magazine designed to inform young science fiction readers of the advancements and general happenings of the outside world. But I doubt that that is its only appeal. Or rather it relates some concepts used in science fiction (sociological, scientific, etc.) with general science to conceptualize the future. It speculates and extrapolates. It simply opens up the outside world. But it will be semi-regular for now.

Kevin Hennessey
Cornwall-on-Hudson, NY

...I've been reading your work for about ten or eleven years (I'm 21 now), so unlike some people who will read and write to comment on your new column in FUTURE LIFE, I'm familiar with more than your reputation. It's this familiarity that causes me to raise a questioning eyebrow at the, uh... mellow tone of your first column (mellow for you). But as you say at the end, we can expect you to be back to normal next time. You will undoubtedly annoy and offend me in the future—but you'll also make me stop and think about the matter under discussion, and scrutinize why I'm annoyed and/or offended by what you've written.

And that's the whole point, isn't it?
P.S. Thanks for introducing me to the Doctor.
Rebecca Ann Brothers
Carbondale, CO

COMIC ELLISON

...Harlan Ellison "possibly the only major author who has written... comics"? (FUTURE LIFE #20, Output) I beg to differ. Alfred Bester, and the late

Otto Binder and Edmond Hamilton, all wrote for comic books at one time or another.

Carol Springs
Monroe, NC

OVERENTHUSIASTIC HACK

...I have only two complaints: That ridiculous creature from the black lagoon on rollerskates that glares for no apparent reason next to Harlan's name, and I think you could have found a better picture of Harlan himself (maybe I'm just jealous at seeing him gloating in front of a shelf on which rest some of his many Hugo awards).

I hate to sound like one of those overenthusiastic letter hacks that usually fill this column but this, I honestly feel, is one of the main events in magazine publishing in 1980.

James J.J. Wilson
Downers Grove, IL

HENDERSON MONSTER

...Watch out, PBS! Hats off to CBS for their recently aired telefilm *The Henderson Monster*. This intelligent production dealt with the ethical and legal questions aroused by recombinant DNA research. It was well-acted, entertaining, and at least as good as *The Lathe of Heaven*, with the added plus of being relevant. Best of all, it presented both sides of the issue, without resorting to simplistic, good/evil treatments. Easily, it is the best piece of SF-TV since *The Quesnor Tapes*.

Dan Obermaier
Franklin Park, IL

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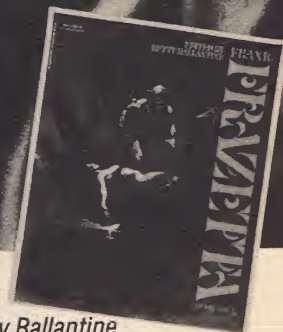
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Produced by Eric Seidman \$8.95

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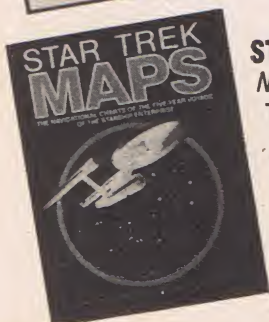


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3-D FOR YOU TOO

GET IT HOLO-SALE

As with many other 20th century technologies, the art and science of holography is finally beginning to enter the realm of accepted reality. People are no longer content just to marvel at the fact that there *is* holography; they want to see it and, if at all possible, own it. And since demand usually creates supply, there are now at least two outlets through which holography fans can fill their needs.

While early holograms required lasers to be seen, there are now a couple of types that can be viewed using an ordinary lightbulb or even sunlight: transmission holograms, which are viewed by holding them in front of a light source; and reflection holograms which, true to their name, are viewed with light bouncing off the front surface of the film.

A small company called The Holo-Ex Corporation is now retailing a variety of transmission holograms (which they call "solar rainbow holograms" because of the way they refract white light). Held in front of a lamp or attached to a sunny window, they will present you with a 3-D image of such subjects as seagulls, jacks or chessmen. Others, called conventional transmission holograms, come with filters which are used in collaboration with a slide projector to create sharp color holograms. All these come framed, with viewing suggestions and instructions. For your copy of *The Whole Holography Catalog*, write The Holo-Ex Corp., PO Box 27056, Philadelphia, PA 19118.

As may be expected, New York's Museum of Holography has available a goodly collection of holography-related merchandise. Their gift shop offers a wide variety of reflection holograms of subjects ranging from antique cars to space scenes, available either in 4"x5" glass plates



Paul Barefoot of the Museum of Holography with "Kiss II", a hologram by Lloyd Cross.

or as pendants and keyrings.

If a simple shape popping out or away from you seems rather static, the museum also offers stereograms: holograms that move as you walk past them. You can watch a train pull into a busy station, actor Marcello Mastroianni casually exhale a cloud of smoke, or a man on a movie screen reach out into his audience. Since stereograms must have a white light source positioned at a 45 degree angle behind and below the film, instructions are included for building a display, or you can order one from the museum. The stereograms come in various sizes, from large 120 degree curved holograms which repre-

sent 15 seconds of real time action, to flat micro stereograms which represent three and a half seconds of real time and which, according to the catalog, you can carry around in your pocket and view any time in direct sunlight.

If you'd rather do it yourself, the museum also retails literature on holography, ranging from simple histories and photography books, through elementary holography for beginners and all the way to texts for serious students of the art.

Finally, if all the above strikes you as too pedestrian for your sophisticated tastes, you might want to go all out and have your very own holo-

graphic motion picture made to order. For the paltry sum of \$550 (actually not all that expensive, considering the equipment needed), the museum will arrange to have a 120 degree stereographic hologram made of you, your pet dog or anyone else you'd like to remember in three dimensions. "The subject and action are up to you," reads the catalog. "Anything is possible, as long as it can be done in slow motion." The possibilities boggle the imagination.

For a copy of the Museum of Holography's catalog, write the Museum of Holography Bookstore, 11 Mercer St., New York, NY 10013.

—Barbara Krasnoff

HOLO ON WHEELS

FUTURESIGHT

New York's Museum of Holography will soon be sending a new traveling exhibition of holography to art museums and galleries around the country. The show, called *Futuresight*, will showcase the art-

work produced by nine top-rated holographers. According to museum director Rosemary Jackson, "Futuresight is a milestone because it is the first show to focus on the artists working in holography, rather than the medium itself. The work done by New York holographers is at the forefront of artistic innovation in the world. The pieces chosen

from the museum's collection representing these artists are some of the finest holography in the world today. Their varied approaches clearly indicate that holography is a versatile medium for artistic expression."

Futuresight follows up the museum's first touring exhibition, *Through the Looking Glass*, an introduction to holography which has

thus far been shown in 24 cities in three countries. The new exhibit will hit the road after being displayed at the museum's permanent collection gallery through November 2nd.

For further information, contact the Museum of Holography, 11 Mercer St., New York, NY 10013; (212) 925-0526.

—Barbara Krasnoff

PLASTIC WRAP

CUT FROM THE SAME CLOTH

What do Devo and archvillain Sador have in common?

Both suffered under the gentle hands of Durinda Rice Wood and for both she wielded the same dark weapon: yards of steel-gray, textured vinyl.

It began when Wood was hired to design the costumes for the recently released space adventure *Battle Beyond the Stars*. The script called for a ruthless conqueror of planets named Sador who was shaped into a princely, Count Dracula-type when actor John Saxon accepted the role.

Wood sketched a Sador costume, slightly Hitleresque, slightly Napoleonic in flavor, fashioned it out of a dark, crinkled vinyl and began pinning it on Saxon.

A newcomer to vinylwear, Saxon was wary at first.

"As an actor, Saxon wants to be as comfortable as possible. He wasn't too thrilled wearing it in the beginning—it was very, very hot. But he saw the way the costume came out and was willing to put up with the suffering," Wood recalls.

No sooner had Saxon conceded than Wood had new wave group Devo sweating in costumes made of the same material.

Battle's set designer John Zabrucky had invited members of Devo to the set to meet with Wood and see her work.

"Devo really likes Japanese design... very clean lines, less detail, simple—that's the beauty of Japanese art. They're very interested in design. It's just as important as their music. That's the impression I got," Wood says.

Though they "have their visual thing pretty much down," the group hired Wood to design the costume they would wear on their tour of Japan and Europe and ultimately on the cover of their new album.

What they came up with was a two-piece, square-look suit, minus pockets, minus detailing. "It's like the '50s businessman's suit, a little surrealistic, almost making fun of the '50s businessman; taking it out of context," Wood admits.

Always concerned with how her clothes move with a body during a performance, Wood had the group don their outfits and jump up and down a couple of times for a test run. To make sure the clothes held up on tour, Wood sent each away with three pairs of pants.

"New wave came about out of frustration and fear. It's another form of rebellion," says Wood. "It interests me because it's a reaction



PHOTO © 1980 WARNER BROS. RECORDS

against what's happening in this world; a reaction against capitalism.

"A lot of this movement is showing the suffering. When you're young, you're told not to rip things and jump up and down and scream. When you walk down the street, you see that people are not going the regular way of dress and this is apparent in new wave music and the whole approach."

Unlike Saxon, Devo is familiar with and actually welcomes discomfort on stage.

"The vinyl and sweat and all are an important part of the giving, the suffering on stage. Some rock and roll people wear individual costumes, but everyone in Devo wears the same clothes. I think that's to portray the alienation that people feel in life right now."

—Susan Adamo



PHOTO © 1980 NEW WORLD PICTURES

Devo (above) and archvillain Sador sweat it out in vinyl.

PUBLISHING DISASTER

ON THE MOUNT

When Washington's Mount St. Helens exploded early on the morning of May 18th, it was not only one of the biggest natural disasters of the century (and the first on the North American continent to take lives). It was also the most publicized natural disaster ever. The American media walked, rode and flew to Spirit Lake to take pictures of the volcano, pictures of the devastation, pictures of the millions of tons of ash that settled over the surrounding countryside.

An enterprising publishing group called Madrona and Longview Publishing, realizing the marketability of a book about the eruption, has come out with what is probably the first volume of photos and information about Mount St. Helens, entitled *Volcano: The Eruption of Mount St. Helens*.

This 96-page, large format paperback was put together in the space of one month by the combined staffs of the Longview Daily News and the Bellevue Journal American, two Washington newspapers. The photography is spectacular: Huge clouds of ash and rubble pour out of the mouth of the volcano just seconds after the explosion; rivers boil over



with hot mud; an area that was once green forestland becomes a waste of ash and dead trees; people shovel layers of ash off their cars. The accompanying text, while occasionally tending to lapse into corny metaphors ("...entire forests lying like so many strands of an enormous windswept hairdo..."), gives readers a good sense of the events as experienced by those who were there.

Volcano: The Eruption of Mount St. Helens is priced at \$6.95, and is published by Madrona Publishers, Inc., 2116 Western Ave., Seattle, WA 98121. —Esther Summerson

STELLAR SURVEY

STARGAZER'S GUIDE

If, when somebody mentions stargazing, you think Alpha Centuri rather than Robert Redford, you would probably be interested in a survey recently released by the Astronomical Society of the Pacific. As published in their journal *Mercury*, the survey counted approximately 15,000 individuals who are "members of nationally organized groups whose main aim is to promote and enjoy astronomy as a hobby." They found out that many of these groups have local chapters that meet regularly for workshops, parties and/or lectures; others have yearly conventions or even sponsor active programs of amateur research.

In order to promote interest in astronomy, the Society is sending out free copies of its survey and a directory of amateur astronomy organizations to anyone who requests one. Send a legal-sized, stamped, self-addressed envelope to: Amateur Guide, Astronomical Society of the Pacific, 1290-24th Avenue, San Francisco, CA 94122. —Barbara Krasnoff

ON THE LOOSE

ONWARD AND UPWARD

Eagle-eyed readers will probably notice something different about this issue's masthead. Aside from the fact that, for once, it's printed in English, the name Ed Naha is no longer listed under the heading "editors." After two and a half years of blood, sweat and yogurt, Naha has left the FUTURE LIFE offices pursuing a career in freelance writing. (He has even bought a pair of Addidas to help him in this quest.)

Originally the senior writer of STARLOG magazine, Naha joined the FUTURE LIFE staff with issue #1, co-editing the publication with Robin Snelson beginning with issue #9. He leaves a broken typewriter and cluttered desk behind.

This fall will see the publication of three of his books. *The Paradise Ploi*, a novel concerning the world's first space habitat, will be published by Bantam books in November. *Wanted*, a collection of SF art, will be unleashed by the same publishing company in August (excerpted on page 26). A rather hefty reference book, *The Science Fictionary*, will make its way to bookstores via Seaview Books in November as well.

Well-known for his red bozo nose and threatening remarks to the publishers, Mr. Naha will be missed by several readers in the Ontario area... who have never met him.

HIGHER EDUCATION

CLASSROOM FOR SPACE PROFITEERS

Attention extraterrestrial entrepreneurs: The first course devoted entirely to space industrialization will be launched September 25 in New York at The New School. The 14-session course, entitled "Working Space: A Primer to Extraterrestrial Profits," will be taught by Dr. Mark R. Chartrand III. Chartrand is a well-known science writer and lecturer, as well as the chairman of New York's Hayden Planetarium.

In the first class, Earth will be considered in its astrophysical context. After that, it's just the brass tacks of commercialization. Some topics to be covered: How we must cooperate—or compete—with other nations in space; the role of the military in space and its effect on commercial efforts; the present and future uses for space as an information switchboard; the emerging and complicated field of space law; profit potential of remote sensing of Earth by satellites; products and services uniquely available

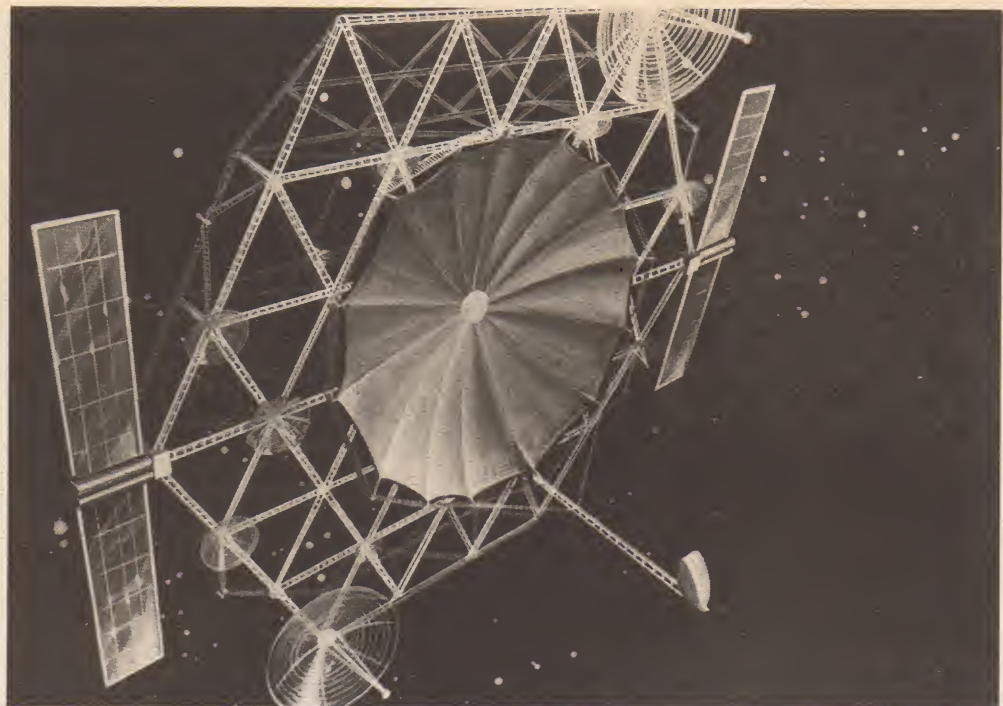


PHOTO: NASA

Space commercialization—the topic of a course at the New School—will depend on large platforms in orbit.

from the space environment; and of course a long look at NASA's space shuttle.

If your sights are set on the stars and there are dollar signs in your eyes, contact The New School, 66

West 12th Street, New York, for enrollment information.

—Robin Snelson

BACK ISSUES



#1—Backwinding Super-8 Film; Foreground Miniature Technique; Aerial Brace Construction.



#2—Spaceship Modelmaking; Blood Makeup; Smoke Generator; Light Beam Effects; Making an SF Logo.



#3—Robot Construction; Developing an Animation Style; Fluid Art Animation; Electronic Special Effects;



#4—Aerial Image Optical Printer; Construction; Wire Armatures; A-B Rolling; More Electronic Special Effects; Fog and Mist Effects.



#5—Aerial Image Optical Printer; Usage; Widescreen Super-8; Split Scan Effects; Glimmering Eyes for Stop-Motion Models.



#6—Amazing Electronic Gadgets—Cheap; Bring Your Alien to Life—Latex Masks; Basic Editing Techniques; Invisible Man Effects.



#7—Basic Cartoon Animation; Claymation; Kaleidoscope Effects; Profile: Santostephano

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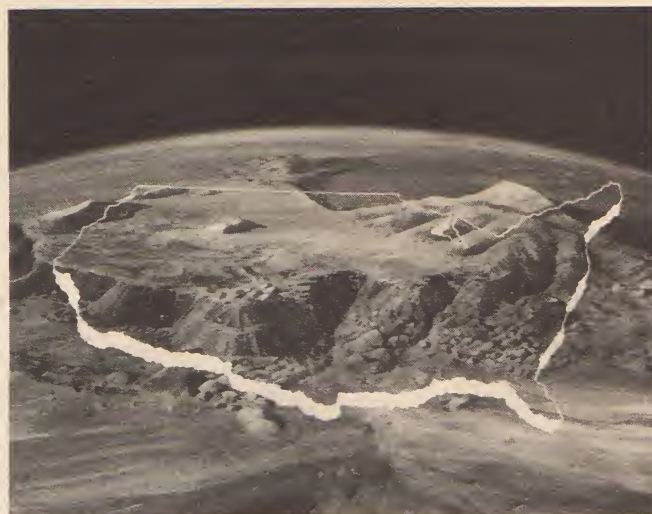
ASCENDANT ROCK

"We're a high-tech, low-culture band," says David Javelosa, primary spokesman for and one-third of Los Microwaves, a loony trio of ascendant rock futurists from San Francisco. Javelosa, who started the band almost two years ago, contributes prodigious synthesizer and songwriting skills to the Microwaves, in addition to his wonderfully glib, precocious space cadet phraseology. His comrades in this "post-techno-primitive" musical venture include Meg Brazill—singer, lyricist, bassist and bizarre wardrobe—and Todd Rosa, enthusiastic provider of ferocious beat through the medium of a finely tuned, self-wired drum kit.

Los Microwaves are a tongue-in-cheek, bargain-basement synthesis of cultural reference points; a band that unashamedly embraces the varied backgrounds of its participants. Javelosa, having grown up in the Hispanic end of San Jose's

"Silicon Valley" (the country's largest concentration of microprocessor and computer hardware manufacturing) is half technocrat, half party animal. "Before there was a pop-band Los Microwaves," he notes, "there was an experimental electronic ensemble Los Microwaves." The band's name was David's idea of a joke. "It represents minimal technology with a Latin accent, Technicano music." It is no surprise then, that the band performs a scorching rendition of that old chicano chestnut, "Tequila" as one of its encores.

It was in the summer of '78 that David found himself struck with the notion of fusing dance rhythms and electronics. "I was in the middle of this disco party, and someone put Kraftwerk's *Trans-Europe Express* on the stereo. I was amazed—the music was so compelling, and the whole room kept dancing. I knew I had to do something like that." David then set about recording a pop single in the electronic music studio at Mills College, Oakland, enlisting help from Meg, an actress with a yen



Topography measurements by the Pioneer Venus spacecraft have revealed a giant continent on the planet, Ishtar Terra, shown here in scale with the size of the U.S. The massive plateau is named for Ishtar, the Assyrian goddess of love and war.

PHOTO: NASA



Meet Los Microwaves: David Javelosa, Meg Brazill and Todd Rosa.

PHOTO: JACK ARNHEIM

to rock, and a since-departed drummer. "Forever"/"I Don't Want To Hold You" was released in January of '79, and bears little resemblance to the present band's sound. Todd happened on the scene about a month later, impressing Meg and David with his concern for the tonal qualities of his instrument.

"I was bored with the flat sound most drums get in the studio," Todd explains, "so I wired my kit with some FRAP contact mikes and treated the signals with a phasing device." The result is a distinctive coloration given to the sound of the rhythm pulse, a beat endowed with a unique melodic capability. Todd and his Amazing Singing Drums can be heard beating away on the band's second single "Radio Heart"/

"Coast To Coast" (released in January '80 on the band's own Soundchaser label, which your local retailer can order through Jem or Systematic distributors). The A-side is a fierce dance tune that owes a debt to the B-52's "Rock Lobster" with its insidious bass-lines and irresistibly infectious chorus. Play this one loud.

Upcoming in the near future is a six-song EP scheduled for early fall release, entitled "Life After Breakfast," with an album planned for spring or summer '81. Los Microwaves are certainly a band on the move, as David indicates when he confides with a suspiciously straight face, "I'm having all my equipment modified for escape velocity endurance." —Lou Stathis

ANATOMY ON THE AIR

THE BODY IN QUESTION

One of the newest BBC productions to alight on American shores is *The Body in Question*, a 13-part, hour-long series which explores health and the human body. Filmed on location in the United States, Europe, Africa and South America, the program focuses on personal and historical patterns of illness and doctor-patient relationships.

The host in question is Dr. Jonathan Miller, a multi-talented personality who was last seen stateside starring in a Broadway review (which he co-authored) entitled *Beyond the Fringe*. In *The Body in Question*, Dr. Miller recreates early scientific experiments, performs the first post-mortem to be filmed for television, subjects his own body



Dr. Jonathan Miller at work.

PHOTO: PBS

to the rigors of jet flight and mountaineering, and uses special effects, art, architecture, historical recreations and live experiments to clarify complex medical knowledge.

The Body In Question airs weekly on PBS beginning Tuesday, September 30th.

—Esther Summerson

SHUTTLE SHUFFLE

GETAWAY DELAY

As many of you may have noticed, NASA's space shuttle has not yet left the planet.

While this is disappointing to us all, the news may bring a special pang to those of FUTURE LIFE's readers who entered our Getaway Special Contest. As you may recall, last year we offered the use of a five cubic foot payload space on the shuttle to the person who came up with the most original, unusual and feasible idea for an experiment.

Since then, we've gotten quite a few responses—many of them outrageous, some downright sadistic (several babies were volunteered for space flight by their older siblings) and a few that were very interesting indeed. In the meantime, two deadlines have come and gone, and the shuttle is still being tested.

Therefore, we've decided that there is no real reason that we should close the contest quite yet. This time, to be on the safe side, we are extending the deadline for the Getaway Special Contest until midnight of the day that the shuttle finally makes its maiden flight, and will notify the winner of the contest three months after that.

Remember: Contest entries should be no longer than one typewritten page, and entries should include the contestant's name, address, telephone number and age. Send it to: STARLOG/FUTURE LIFE Getaway Special Contest, 475 Park Avenue South, New York, NY 10016.

(By the way, there are still a few remaining copies of our Getaway Special Starter Kit, which gives information about the shuttle, hints on what is and is not acceptable as a payload, and where to go for help in researching your project. The Kit costs \$3.00, and is obtainable at the above address.)

F

The Vice Potential of Zero-G

Monsters in Orbit, by Jack Vance, is the only science fiction story I have read which explores the vice potential of zero-g. No, it's not about the kind of vice where one floating person shares deoxyribonucleic acid (DNA) with another. I'm not going to cover that issue in this column because it's basically old hat—cave people used to do similar things, albeit weighted down with gravity, and it's not considered much of a vice nowadays—and in any case Tom Hopenheimer already covered that topic in FUTURE LIFE #15.

In *Monsters in Orbit* Vance predicted one of the real vices of zero-g. His "monsters" were space colony denizens who liked being fat. Really fat. Beach ball proportions.

What's so terrible about being fat? On Earth the obese get heart attacks easier because of the stress of their weight; they can't move very fast, and they take up two seats in the movie theater. But in free fall, no problems! (And no seats.)

In fact, fat can be an advantage in zero-g. Although nothing has weight under those conditions—weight is the ability to make that bathroom scale read off the pounds—things still have mass, which is why a car is totalled when it smashes into a wall at 60 mph. What that means is that in a free fall barroom brawl, the huge fat guy, with his superior mass, will beat the living daylights out of the muscular but lean Earthworm dumb enough to cross him.

I can see it now. Orbiting police forces will require all their recruits to mass at least 200 kilos, and worried moms will stuff jelly rolls and greasy french fries into their kids so they won't get beaten up by the neighborhood bully. Right?

But it won't happen that way, at least not at first. NASA plans to require people working in zero-g space stations to return to Earth after only three months in orbit so they can readjust to gravity.

That's because zero-g is intrinsically a vice. The most discipline-smashing, deliciously fun and addictive experience humans have ever encountered.

Discipline-smashing? The first astronaut to take a space walk, Edwin White, refused to return to his capsule when his orders called for it. Oh, yes, he had an excuse. He forgot to check the time, you see, and was so busy chattering over the radio that he forgot to let Mission Control on the air to remind him.

Then there was the Skylab crew, Gerald Carr, Ed Gibson and William Pogue, who ignored orders to hold off on the acrobatics for the first several days in free fall until they were sure they had adjusted. Figuring that what Mission Control didn't know wouldn't hurt



© HANK CARUSO 1980

them, they whooped it up right away. Pogue whooped up his cookies, too (motion sickness), but the astronauts cleaned up and hid the evidence. They got caught however, because NASA had bugged Skylab. (Remember, it was built during the Nixon years.)

It's not just U.S. space jockeys who succumb to the temptations of zero-g. Soviet cosmonaut Georgiy Grechko admitted that in December, 1977, "... we concealed that not only the flight engineer went out into space, as called for in the program, but also Yuriy Romanenko. It was very difficult, naturally, for him to restrain himself." Romanenko's flirtation with the lure of free space was nearly fatal. When he sneaked outside the Salyut-6 space station, he forgot to fasten his safety line and began to drift away. Grechko caught the end of Romanenko's safety line just before Romanenko drifted out of reach.

Deliciously fun? Listen to astronaut Wally Schirra: "Feeling weightless . . . I don't know, it's so many things together. A feeling of pride, of healthy solitude, of dignified freedom from everything that's dirty, sticky. You feel exquisitely comfortable, that's the word for it, exquisitely . . ."

Addictive? You'd better believe it. Psychologically addictive—cosmonauts Vladimir Lyakhov and Valeriy Ryumin, on return from their record-breaking 175 days in free fall, complained that their earthside beds felt hard as rock. Physiologically addictive—bones weaken and the cardiovascular system forgets how to handle gravity.

For these reasons, in the early days of space living, excessive use of zero-g will be considered wicked. "Don't you have any respect for your bodies, kids? Don't you ever want to walk again on the surface of Mother Earth?" the cop will admonish as he herds out rebellious teenagers who have been putting in too much time in the free fall rec area.

However, as time passes and space dwellers begin to view Earth more as an exotic, gravity-infested curiosity instead of as home, grav lib will catch on. For example, what about the physically handicapped? Robert Heinlein's novel *Waldo* features a victim of myasthenia gravis, a disease which makes a person as weak as a gnat, who takes up permanent residence in orbit where freedom from gravity allows him a near-normal existence. People who have lost their legs, as another example, will be almost free of handicap in zero-g, as space veterans report that they mostly get around by pulling on things with their arms. Legs become almost superfluous.

Once an exception has been made for the handicapped, the moral barriers will come tumbling down. People with back trouble, pregnant women, and, yes, the overweight will demand the freedom to remain in free fall. Professional dancers whose injuries threaten early retirement will refuse to perform except on low or zero-g stages . . .

Some people may choose to go the other direction. A space colony, by speeding up its rotation, could have greater than one gravity. Beagle puppies which were raised in a centrifuge at two gravities grew up to look like basset hounds and had phenomenally strong hearts. Children raised in a two g space colony may grow up to look like sumo wrestlers and will bound around like gazelles in the relatively low gravity of Earth.

I like the idea of a home with a dial, like a thermostat, that I could turn to set the g level. Many a time my husband Keith and I have had trouble getting our gymnast daughters to sleep. It's midnight and wham, thump, crash, they're still doing roundoff back handsprings in the bedroom. In space we'll just turn up the gravity until they're glued to their beds. And when things have quieted down and we're gazing deep into each other's eyes . . . time to turn off the gravity. "You feel exquisitely comfortable . . ."

COSMOS

Carl Sagan's breathtaking tour of the universe
is a startling departure for science on television

By ROBIN SNELSON and ED NAHA

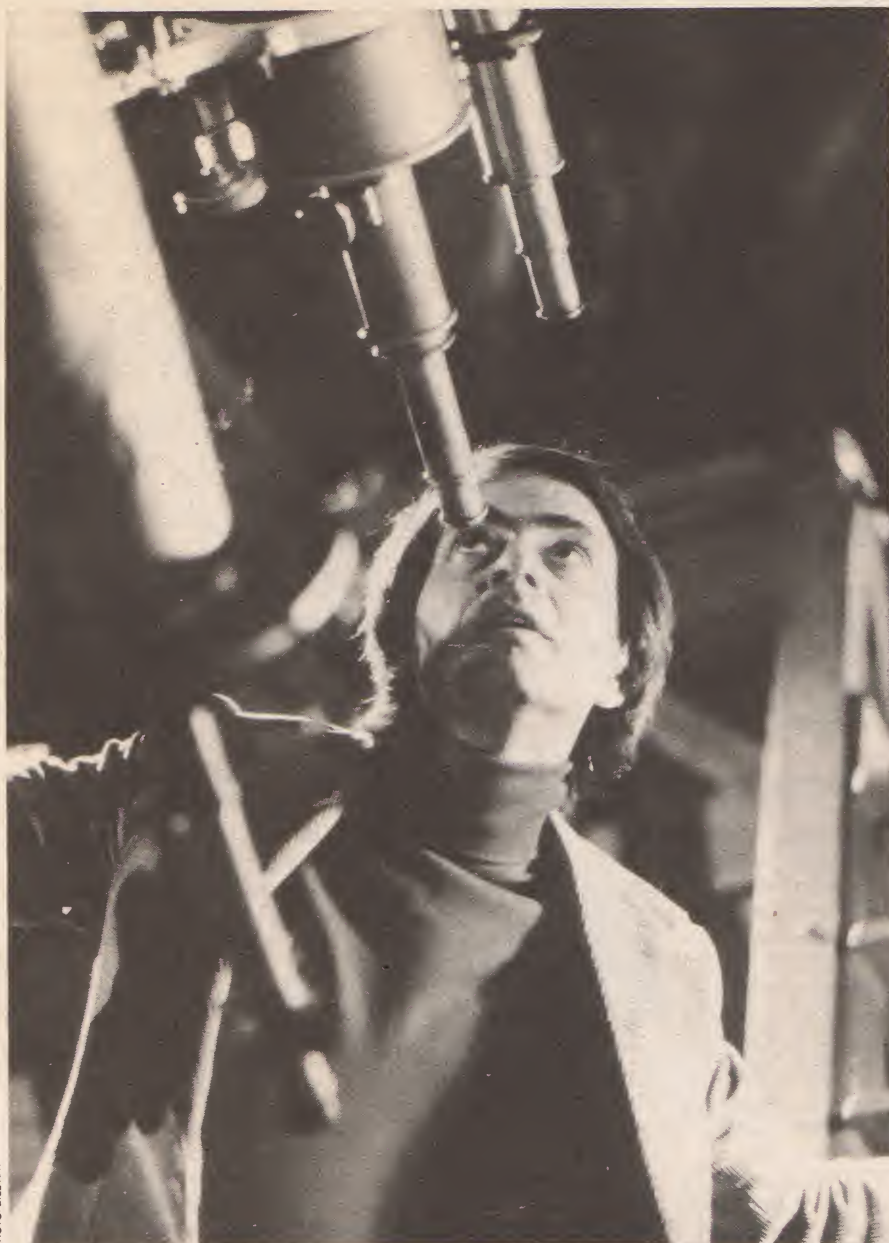


PHOTO BILL RAY

Carl Sagan uses telescopes and spaceship special effects to explore the cosmos.

Pulitzer Prize-winning astronomer Carl Sagan sits at the helm of a spectacular, cathedral-like spaceship. As the ship sails across the universe, swirling galaxies and throbbing pulsars flash across the vessel's enormous viewscreen. Clad in a homey, corduroy sportcoat that seems especially earthbound in the grand, futuristic context of his faster-than-light ship, Sagan wears the delighted expression of any earthling fortunate enough to be whisked past the wonders of the cosmos. "Cosmos is all that is and all that was and all that ever will be," he observes, his voice touched with awe.

Sagan's voice echoes across the cinder-block screening room at KCET's television studios in West Hollywood. In the center of the room, on a small television screen, the astronomer continues his epic voyage for the benefit of a small group of television critics. Outside the viewing cubicle, in offices, corridors and editing rooms, countless creative minds labor to finish Sagan's journey... a 13-part television series which airs on the Public Broadcasting System beginning September 28: *Cosmos*.

Cosmos is the most ambitious series ever attempted by PBS and is, undoubtedly, the most intricate science program ever to reach television. Boasting spacey special effects that are the video equivalent of *Star Wars*' widescreen wonderment, the imaginative production took three years to prepare and \$8 million to complete.

The series, which will reach an estimated worldwide viewing audience of 150 million, will take its viewers on trips through time and space in a manner unprecedented in the history of broadcasting. Host Carl Sagan will lead his fellow travelers through a black hole, the human brain, the plains of Mars and the ancient library of Alexandria. The origin and evolution of life will be seen on the screen. DNA molecules will replicate themselves. The Rosetta Stone will be re-discovered. Planets will be spawned and will die. For 13 weeks the wonders of the universe will be contained in 60 minute excursions into the imagination.

Right now, however, at KCET, the prevail-





To illustrate time travel paradoxes, Sagan climbs aboard a time machine replica.

ing attitude is a bit more down to Earth. With little more than two months before airtime, the series has yet to be edited into final shape. Although deadline pressure hovers in the air, it's clear that all involved with the project are euphoric. With good reason. If *Cosmos* succeeds on PBS, and there is every indication that it will, it will revolutionize the concept of science programming on television.

"I think the series will change American television," says 29-year-old project director Gregory Andorfer. "It will prove that American public television can do the kind of series that the BBC has always done in the past and do it on its own grounds with its own techniques and styles. I hope people will come away from this show with an appreciation of the universe and appreciation of life on this planet. *Cosmos* could start a tradition."

A smile plays across Andorfer's face. Before him, in the center of his office, a *Cosmos* "teaser" tape flickers on a video unit. Behind him, a painting of the Milky Way with a small "you are here" arrow affixed to it leans against the door. If anyone has cause to smile over the coming of *Cosmos*, it's television newcomer Andorfer.

Four years ago, while toiling at KCET, he noticed a fairly disturbing trend in American public television. Most of the in-depth series, like the *Ascent of Man* and *Civilization*, were of British origin. A sudden thought struck him. Why couldn't American public TV mount equally as impressive productions?

In the fall of 1976, a little more than a year after graduating from UCLA, Andorfer approached scientist Carl Sagan with the idea of doing an American series on the history and contemporary significance of astronomy. At this point, the proposed series was called *The*

Heavens. Sagan, the charismatic spokesman for contemporary science, was immediately intrigued with the idea. At that moment Sagan was not too happy with the way television was handling the scientific realm. He had just formed his own production company with Jet Propulsion Laboratory colleague Gentry Lee and was looking for a suitable project.

Recalling the origins of *Cosmos*, Sagan, in his KCET headquarters, suppresses a chuckle. "Gentry was the science analyst and mission test director of Viking, number three man in the Viking Mission. Among other things, he's had experience spending a billion dollars, so this is nothing.

"Seriously, we were totally disappointed with the way Viking was being treated by the media. After knocking our heads against the wall trying to generate more media interest in the mission, we decided to do it ourselves. We treated it as a joke at first but then we decided what the heck, we'll make a company and see if we can do anything. Then, just at that time, a lot of offers came in. The KCET project was one. It sounded like a great idea."

Carl Sagan Productions and KCET joined forces. A creative team to end all creative teams was assembled. Adrian Malone, the executive producer of the award-winning BBC television series *The Ascent of Man* and *The Age of Uncertainty*, was recruited as executive producer/series director/co-writer. Malone called in filmmakers from both sides of the Atlantic to form the *Cosmos* squad.

At that point, funding for the impressive idea was needed. Fortunately for the *Cosmos* crew, the celluloid science fiction boom in progress by that time made it easier for the video science series to get off the ground.



A recreation of the Viking landing on Mars was staged in Death Valley.

"The success of *Star Wars* helped us raise money for our very visual approach," explains Andorfer. With funding coming from the Atlantic Richfield Company, the Corporation for Public Broadcasting and the Arthur Vining Davis foundations, and with the BBC and Germany's Polytel International acting as co-producers, the stage was set for the launching of *Cosmos*. The launch, however, was a slow and laborious one.

Idea To Reality

The brick-faced studios of KCET stand in West Hollywood; time-worn structures once used by Monogram Pictures to crank out



On location at the Jet Propulsion Lab.



PHOTO EDUARDO CASTANEDA

Fact: An accurate model of Valles Marineris on Mars.



Fiction: A ruined Martian city symbolizes discredited ideas.

countless Charlie Chan and Dead End Kids movies. Two years ago, they were called upon to take Carl Sagan out of this world... literally. "It was a bit like building a luxury liner in a small boatyard halfway up the river," muses BBC veteran David Kennard, one of the series' producer/directors.

The embryonic show certainly had its work cut out for it. Aside from using over three dozen geographical locations, *Cosmos* had to visually create the origin of life on Earth, a tour through the ring particles of Saturn and the most distant reaches of the universe. All of these visual whammies had to be executed in Hollywood and on a very reasonable budget, too. The task was so monumental that most of Hollywood's established special effects mavens shied away from the challenge.

"The amount of detail called for in the series was enormous," recounts Andorfer. "When I was originally costing the effects, going around to all the production houses in town, a lot of them were scared of touching this. They said, 'Sure, we'll do it... but not for a fixed bid. Yeah, we can create a nebula. We can throw some chemicals in a solution and watch them fizz and film at high speed and that will be a nebula. But you guys want the Crab Nebula and it's gotta look just so and be these exact colors and it's gotta be just right. Essentially, it requires so much input and so many things can go wrong that it will take too much time for it to be worth our effort.'"

Cosmos, at that stage, found itself stymied. Here was a possible eye-boggling series in the midst of a special effects boom in Hollywood without any effects to call its own. "It's possible that the success of *Star Wars* and other related movies made the underwriters think that it was reasonable to give us the money to do *Cosmos*," explains Sagan. "But it hurt us, too, because the cost of special effects just skyrocketed. We couldn't afford any of the principal practitioners."

Help arrived from out of the blue. JPL was contracted, at a reasonable rate, to execute stunning computer graphics. The creative video magicians at Magicam also entered the fray. Seeking to both enhance their reputation and meet the challenge of creating massive special effects using exacting miniature scenery and Magicam superimposition (a process wherein a life-sized Carl Sagan will find himself dwarfed by a massive Library of Alexandria which is, in reality, a miniature set), the Magicam crew took on the olympian assignment for less than \$500,000.

Extra help came from the astronomical art circle. "Fortunately for us," Sagan beams, "there were a bunch of marvelously talented young artists who, working for nothing like the amount of money they deserve and, I hope, will shortly command, did just exquisite stuff. Jon Lomberg, John Allison, Adolf Schaller, Rick Sternbach, Don Davis, Anne Norcia... they've done a spectacular job. There's a whole new visual look

to *Cosmos* that I've never seen before."

Between globe-trotting to locations from Cairo to Italy and lensing intricate space effects in the small studios, the *Cosmos* staff found itself immersed in shooting sprees which lasted over 18 months.

"The finished series will be a good mix of effects, location, documentary and drama," says Andorfer. "For example, in one show, we have documentary verite coverage of the Voyager/Jupiter encounter last summer, a recreation of 17th century Holland in its exploration era, a trip through the ice rings of Saturn and a landing on Titan. That's all in one show. You never know where *Cosmos* is going to take you.

"In terms of being a television effort *Cosmos* is unique in that there hasn't been any other series that has had to combine all these various techniques in order to achieve a finished product. We're combining not only documentary material but dramatic material and special effects and a lot of state of the art technology. We shot at over 40 locations. Most of our location scenes were shot with 16mm film. Most of the special effects were shot on 35mm. We also used a lot of computer animation: equation-driven graphics where there was not any art input at all, just numbers creating a three dimensional moving image. Then we mixed in all our videotape stuff. All the Magicam scenes are on video where the final composing was done electronically.



Magical wizards Jim Dow (left) and Tom Pakh with the exquisite model of the lost Alexandrian library.

"I don't think the visuals are going to run away with the series because they're woven very tightly with what Carl has to say. The series was really built from the ideas out. The effects, in most cases, are not just there to dazzle. They're meant to teach people. Instead of going overboard with the effects, I think we've used them in a way that will interest a lot of people who aren't normally drawn to science and serious subjects."

Although the final series will be laden with spectacular effects, Andorfer points out that most will not be of the fanciful science fiction variety. "Putting real hard science and accuracy on top of special effects has not been easy. At the same time, I think it's our time-consuming approach that will separate our effects from a lot of others. I think the fact that we went to great pains and worked with our artists—who themselves know a lot about science and are the best at modeling and painting space—makes our effects the kind that won't be easily duplicated."

Scientifically accurate special effects, it seems, are the hardest variety to pull off successfully. "When we modeled the Orion nebula," Andorfer says by way of illustration, "we went all out trying to make it as accurate as possible in terms of size, shape and color. We used about 50 or 60 consultants on one major effects piece called 'The Cosmic Zoom' consulting them at the idea stage, consulting them when we were designing the

effect, consulting them after the artwork was done and, then, frequently consulting with them after the fact to see if everything was right.

"Venus also proved an interesting experience in terms of accuracy. We had shot a model which we didn't really like; it didn't work well dramatically and it also had some things we began to find out were not actually on the planet's surface. So, we started build-

ing another model. Then, all of the Pioneer Venus data was released. So this model was three-quarters built, a huge tabletop affair down in the shop, when we had to scrap the whole thing. We had this wonderful broad plain coming down, rivers of lava and all that sort of stuff when we found out that, because of diffusion of the atmosphere, you don't have large vistas on Venus. So the finished Venus on the show is, perhaps, not as inter-



Executive producer Adrian Malone.



Project director Greg Andorfer.

PHOTOS: MITZI TRUMBO

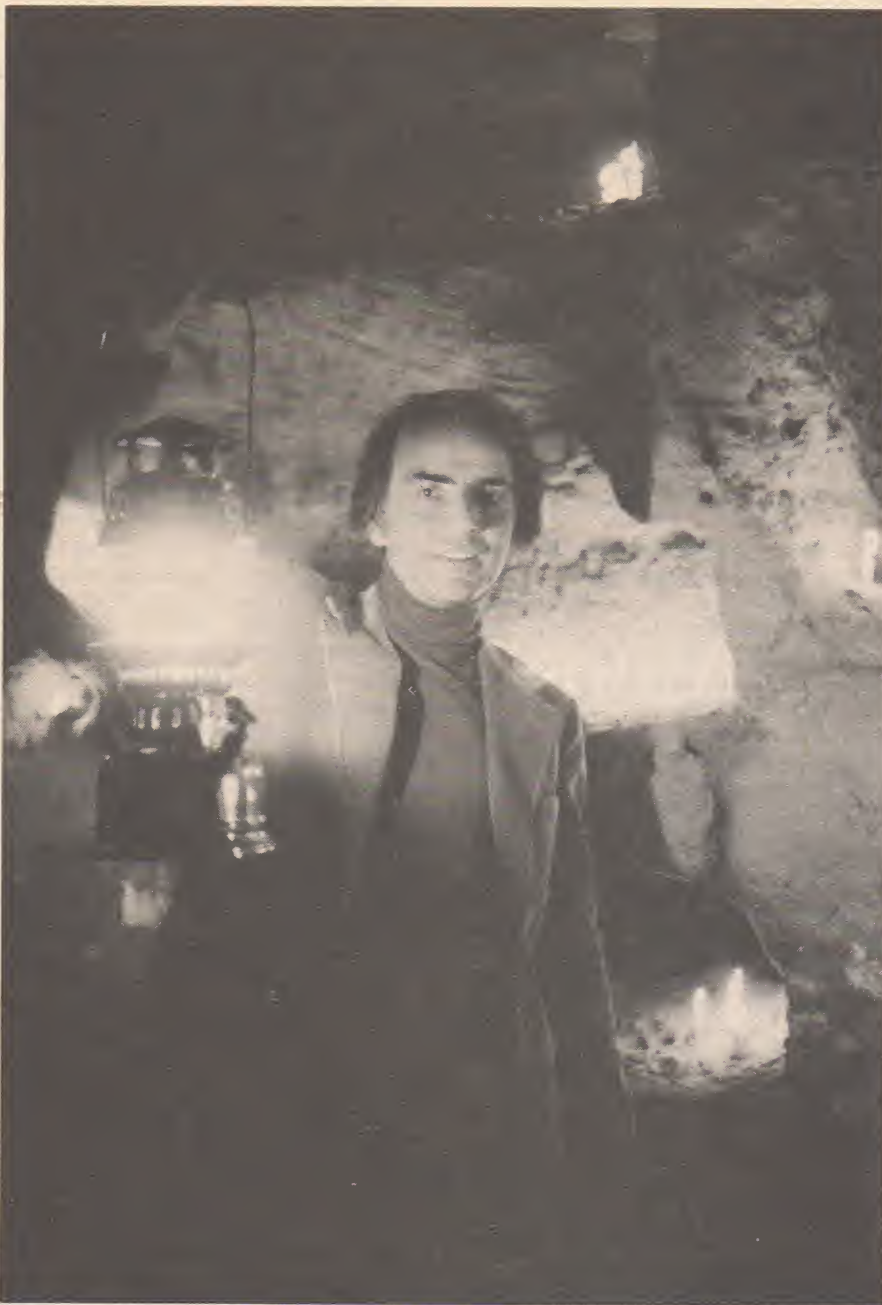


PHOTO BILL RAY

Before his Magicam tour of the Alexandrian library, Sagan visits the real site.



PHOTO EDUARDO CASTENADA

Explaining the orbits of the Planets, Sagan juggles a solar system model.

esting as it would have been earlier but it's a lot more accurate. We had to throw out two Venuses because the science changed in the middle of our shooting schedule!"

The task of traipsing through the cosmos proved so monumental that the series called for a unique system of community directing in order to keep things moving at speed. Says associate producer/director Richard Wells: "The joke on the set was 'Two directors, two producers. No waiting.' The crew would finish a hectic shooting, then be packed onto a plane and flown to another location where they'd be confronted with a fresh director and producer ready to go again!"

Adding to the general hilarity of non-stop globe-trotting was the fact that the show's creative forces were composed of an experienced British camp and eager-to-learn American one. "It's not the sort of program that's been done in America before," says Adrian Malone. "What makes it different from other sorts of programs is that it does deal in a synthesis. It takes a number of disciplines, biology, physics, mythology, astronomy and other slightly less definable disciplines, and brings them together into one view of humanity's place in the cosmos. I think it's that synthetic approach that makes the difference."

Producer/director Geoffrey Haines-Stiles, a Britisher who gained his experience in American public TV, adds, "The Brits working on the production have a different attitude than the Americans. I think the Americans are kind of amazed that you can have two years and a decent budget and really follow a storyline which asks some pretty heavy questions. And I think people who have worked for the BBC take that for granted. It's not unusual to see any topic attacked on American talk shows but it's unusual to have a show with a little bit of flair and color that touches the heart as well as the mind."

With both Americans and British workers jogging around the globe frantically filming the location scenes, even veterans like Haines-Stiles found themselves amazed at the scope of the series. "One of the most bizarre things I got involved with," he says after a tedious day of sound editing, "was taking a Viking lander down to Death Valley to film a sequence on 'Mars.' It involved a vast amount of NASA bureaucracy. All sorts of begging letters and hysterical phone calls and five million dollar insurance policies. Then we had to get a crate built to carry it out there. Then we had to rent a crane. These are things you don't normally do as a television producer. To top it all off, it snowed out there. It was the first time it had snowed in Death Valley in three years. Then, just as we'd come to the end of a take, the Army would start doing bombing runs just a few valleys away!"

While filming a lavish historical scene involving 17th century astronomers Kepler and Brahe in Czechoslovakia, Haines-Stiles encountered more humanistic problems. "The actors in the feast scene refused to work until we used real wine," he laughs. "I must say that the feast went better after we went out

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SPACE ACTIVISTS

For several years now, *FUTURE LIFE* has kept tabs on a phenomenon we've come to think of as the *Radical Space Underground*: a diffuse and constantly growing movement of people dedicated to the proposition of emancipating humans from planet Earth. Science writer Trudy E. Bell recently undertook an exploration of the pro-space activist trend, and admits to being surprised by its magnitude—as well as caught up in a new sense of community.

Yes, readers, there is a space constituency. It is not yet united or powerful, but it is alive with youthful enthusiasm. For those many of you who write to us at *FUTURE LIFE* asking what you can do to accelerate space efforts, Trudy E. Bell has compiled an exhaustive table of the major organizations working toward that goal. Study it well. It is your best tool. If you really want to do something to make it happen, there's a spot in the movement for you to put your talents to work.—R.S.

By TRUDY E. BELL

On pages 22, 23 and 24 is a "score card" of major American space interest groups, accurate as of May, 1980—the first time, to my knowledge, that such a comprehensive directory has been published in a national magazine. The table reveals far more of interest than current addresses and telephone numbers: From it, one can observe some significant trends about American public interest in space.

The table is broken into two general categories: "Trade/Professional" groups and "Citizen Support" groups. Those categories refer to the way in which the groups are organized and/or the qualifications members must meet to join. The

trade/professional category comprises consortiums of whole industries or whole universities that have few or no individual members; it also encompasses professional societies for those who work for a living in space-related fields, and individual members must meet certain professional qualifications to join as active members. The citizen-support category embraces those groups whose primary qualification for membership is interest in the issues at hand.

Number of groups: The table contains 39 space interest groups with nationwide activities. With only a few outstanding exceptions, it excludes individual society chapters and independent local groups. It also excludes many groups that have a positive attitude toward space, but which are not specifically space-interest groups: professional and amateur astronomical societies, Science Fiction Writers of America, science fiction fan clubs, Forum for the Advancement of Students in Science and Technology, International Committee for the Future, World Future Society, and sections of certain technical societies such as the Institute of Electrical and Electronics Engineers. If all those groups had been included, the total count would be closer to 500, easily tripling all figures for budgets and membership. In this sense, this table represents the bare *minimum* of American interest in space science, technology and policy.

Dates founded: Many groups in the trade/professional category go back very early in the 20th century, and were originally based on interest in aviation. The citizen-support groups, however, have all formed since the launch of Sputnik in 1957. Even more striking, they have dramatically proliferated since 1975, with two thirds of them founded just in the last three years. According to Charles Chafer of the Public Affairs Council in Washington, D.C., the sudden proliferation of special-interest groups is often regarded as a leading indicator of issues that will be of major political importance five years ahead.

Types of groups: Within the citizen-support category there are at least four types of groups: groups whose primary purposes are, respectively, educating and informing the public, conducting internal research, funding external research, and engaging in political activities. The education and public information groups, such as the National Space Institute, are the oldest form; they function much like typical astronomical



THE MOVEMENT GAINS MOMENTUM

societies, with meetings, lectures and other public events to promote public awareness of space. The last three types—which aim to turn awareness into action—are virtually all less than three years old, and are particularly interesting.

The groups supporting internal research (such as the California Space Institute, Foundation, Inc., the Space Studies Institute, and the ISSSS) are doing technological and sociological research that is necessary for paving the way toward future space exploration and utilization, but work that is receiving little or no support from the Federal government. Such internal-research groups have diverse funding: individual philanthropists, schools



or universities, private foundations, and—in the case of the California Space Institute—the state government.

The groups funding external research are actually private foundations themselves—modest versions of the Ford Founda-

tion or the Guggenheim Foundation, which are providing to support “critical-path” seed grants research. A few of these, such as the Space Studies Institute and the World Space Foundation, are operating with a fascinating twist: their money comes not from large fortunes, but from the pockets of individual citizens who deeply believe in the work being done. Historically this is fascinating because it repeats the pattern in the 1840s through the 1860s in the American observatory-building movement, when individuals bought modest shares or subscriptions to build some of the greatest observatories in the U.S., including Cincinnati, Harvard, Dearborn and Allegheny. More recently, it’s a pattern success-

fully repeated by several other science funding organizations such as Earthwatch, to support ongoing scientific field research by individual donations and labor.

The groups supporting political activities represent the most recent trend, and the feeling of awakening to political awareness was particularly evident at the American Astronautical Society meeting in Washington, D.C. last spring. The L5 Society is perhaps the leader in this movement, hiring a professional lobbyist in 1979 to lobby for legislation on the floor of Congress. Its efforts have been supplemented in part by the National Action Committee for Space and by Citizens for Space, which in the case of particular issues have organized letter-writing campaigns. This year the National Space Institute—which accounts for half the formal members in citizen-support space groups—has been discussing ways in which it too can make its members’ common interest and voice heard more effectively. “And that,” says NSI’s Courtney Stadd, “means

(continued on page 25)

AMERICAN SPACE INTEREST GROUPS

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(For footnotes, see end of chart, page 24)

TRADE, PROFESSIONAL

NAME	HEADQUARTERS	PRESIDENT OR EXECUTIVE DIRECTOR	INFORMATION CONTACT	TYPE	DATE FOUNDED	ANNUAL BUDGET	MEMBER FEE/ CONTRIBUTION	NO. OF MEMBERS	REMARKS (OBJECTIVES, EMPHASIS, MEMBER BENEFITS)
Aerospace Industries Association	1725 De Sales St. NW Washington, D.C. 20036 (202) 347-2315	Karl G. Harr, Jr.	Gerald J. McAllister, Director of Publications	trade association	1917*	not disclosed	fee based on percent of aerospace business (e)	49 aerospace companies	represents major manufacturers of aerospace and related products; publishes quarterly magazine <i>Aerospace</i>
American Astronautical Society (a)	6060 Duke St. Alexandria, VA 22304 (703) 751-7323	Charles Sheffield	George E. Cranston, Exec. Secretary	professional, general	1954	\$100,000	\$15 student \$30 regular (b) (c)	1,000	dedicated to advancing astronautical sciences and engineering; publishes <i>Journal of the Astronautical Sciences</i> , the <i>AAS Newsletter</i> , and three library series of hardback books; and holds international, national and local meetings.
American Institute of Aeronautics and Astronautics (a)	1290 Avenue of the Americas New York, NY 10019 (212) 581-4300	Artur Mager	Leonard Rosenberg, Deputy Administrator, Member Services	professional, technical	1963	\$6.5 million	\$10 student \$35, \$40 regular (b) (c)	29,000	dedicated to advancing aerospace science and technology, serving the professional needs of members, improving public understanding of the profession and its contributions; publishes monthly magazine <i>Astronautics & Aeronautics</i> ; six archival journals; holds national and local meetings and continuing education seminars
American Society for Aerospace Education	1750 Pennsylvania Ave. NW, Suite 1303 Washington, D.C. 20006 (202) 347-5187	Wayne R. Matson	Wayne R. Matson, Exec. Director	professional association of educators	1976	\$250,000	\$15 regular (c)	8,000	provides a forum and voice for those teaching in aviation and space fields; publishes <i>Aviation/Space Magazine</i> (6x/yr), <i>Directory of Aviation/Space Education</i> ; holds annual summer convention. Members also receive <i>Aerospace</i> magazine (4x/yr), and <i>NASA Report to Educators</i> .
Aviation/Space Writers Association (a)	Cliffwood Road Chester, NJ 07930 (201) 879-5667	Edward G. Tripp	William F. Kaiser, Exec. Secretary	professional association of communicators	1938	\$60,000	\$35 regular (b) (c)	1,500	promotes and recognizes accuracy and veracity in dissemination of aviation and space information; publishes <i>AWA Newsletter</i> , provides professional accreditation and opportunities for awards; holds national and regional meetings
The Geosat Committee	153 Kearny St., Suite 209 San Francisco, CA 94108 (415) 981-6265	Frederick B. Henderson, III	D.G. Park, Administrator	educational	1976	\$280,000	contribution dependent on company revenue (e)	95 oil, gas, exploration companies	articulates the earth-observation satellite needs of the exploration geology community to government; publishes quarterly <i>Geosat Newsletter</i> and periodic updates on programs; board meetings
Universities Space Research Association	311 American City Bldg. Columbia, MD 21044 (301) 596-6131	Alexander J. Dessler, President	W. David Cummings, Exec. Director	nonprofit consortium of universities	1969	\$2.9 million	\$1,200 per university (e)	52 universities	operates Lunar and Planetary Institute, and Institute for Computer Applications in Science and Engineering, both for NASA.

CITIZEN SUPPORT

Amicitia International School for the Future (a)	16 St. Mary's Ave. Clinton, NY 13323 (315) 853-6279	Nancy Briody Kobryn	John Johncox	educational	1978	\$1.25 million	\$10 student \$20 regular (c)	1,250	working to design an educational system intended to be a living model for one that might be built in the first space community; publishes newsletter; holds monthly meetings and annual national convention.
AMSAT: Radio Amateur Satellite Corporation (a)	P.O. Box 27 Washington, D.C. 20044 (202) 488-8649	Perry I. Klein	Perry I. Klein, President	educational	1969	\$150,000	\$10 student \$16 regular \$20 foreign (c)	4,000	designs, builds and operates satellites for experimentation for radio amateurs and amateur scientists; publishes <i>Orbit</i> magazine (6x/yr); holds annual meeting in Washington, D.C., has some regional activities
California Space Institute	Mail code A-030 University of California at San Diego La Jolla, CA 92093 (619) 452-4772	James R. Arnold	James R. Arnold, Director	research	1979	\$380,000	(c) (f)	—	statewide research unit of the Univ. of Calif., supporting space research with emphasis on applications, esp. in four main areas: remote sensing, long-range weather forecasting, space manufacturing, and pure space research esp. astrophysics
Campaign for Space	300 M St. SW, Suite 500 Washington, D.C. 20024 (202) 387-0760	David Webb	David Webb, Executive Director	political action committee	1980	(h)	\$36.50 regular (d)	(h)	supports the campaigns of pro-space candidates running for election; publishes monthly newsletter <i>Campaign for Space Update</i> ; contacts supporters about specific issues on which their actions could have some political effect
Chicago Society for Space Settlement	4N 186 Walter Dr. Addison, IL 60101 (312) 529-1049	Gregg Maryniak	Gregg Maryniak, President	educational	1977	\$2,400	\$15 regular \$20 combined	150	providing public information on space industrialization; monthly newsletter <i>Spacewatch</i> ; monthly meetings, combined membership includes membership to Space Studies Institute.

Citizens for Space	1900 Dufour, Suite 16 Redondo Beach, CA 90278 (213) 374-1381 (msg. machine)	Terry Savage (no officers)	Terry Savage, President	lobbying	1978	\$1,000	\$5 student \$10 regular	120	focuses on the current political scene as it affects space activity; publishes <i>Space Policy Review</i> (4x/yr), holds meetings, has a telephone network for quickly alerting members to fast-breaking events.
Citizens for Space Demilitarization	1476 California St. #9 San Francisco, CA 94109 (write only)	(no officers)	Jim Heaphy (415) 566-3068	educational, advocacy	1979	\$1,200	\$10 regular	80	working for peaceful uses and international cooperation in space, and working to end arms race in space between U.S. and U.S.S.R.; publishes newsletter <i>Space for All People</i> (6x/yr); membership bulletin as needed
Citizens for Space Political Action Committee	3836 16th St. N.W. Suite B-1231 Washington, D.C. 20010 (202) 232-3317	Harrell Graham	Harrell Graham, Director	political action committee	1980	(h)	(d)	(h)	not affiliated with above Citizens for Space. Supports the campaigns of pro-space candidates through contributions, advertising, and volunteers; supporters receive newsletter, action alerts, involvement with local and national campaigns
Foundation, Inc.	85 E. Geranium Ave. St. Paul, MN 55117 (612) 489-4466	Gary C. Hudson	Gary C. Hudson, President	research and development, educational	1971	\$60,000	\$12 per subscription (f) (c)	500 subscribers	sponsors in-house research in technical fields (e.g. launch vehicle design and propulsion systems) needed to promote commercial private space industrialization; publishes monthly <i>Commercial Space Report</i>
Futurian Alliance	1188 Kearny St. San Francisco, CA 94133- (415) 526-8356 (415) 566-3068	Richard Gross	Richard Gross Jim Heaphy Jon Alexandr	coalition of space and future related groups, educational	1979	\$3,000	\$10 regular \$5 limited income	12 groups	promotes public debate on the future with emphasis on future in space, sponsors annual outdoor Space Day festivals each July by coordinating efforts of member groups; publishes periodic literature as needed
Institute for the Social Science Study of Space	P.O. Box 922 Georgetown University Washington, D.C. 20057 (write only)	T. Stephen Cheston	Charles Chafer	research, educational	1978	\$10,000	\$25 all publications \$15 newsletter only (c)	450 subscribers	sponsors research into the social science aspects of space exploration & development; publishes <i>Space and Society</i> newsletter (3x/yr), <i>Space Humanization Series</i> journal (irreg.) and occasional papers; sponsors conferences, clearinghouse of materials for course curricula and information on space social studies in general
L5 Society (a)	1620 No. Park Tucson, AZ 85719 (602) 622-6351	Gerald W. Driggers	Randy Clamons	educational, lobbying	1975	\$150,000	\$15 student \$20 regular (c)	4,000	emphasizes human expansion into space via space stations, transportation systems, and eventual space colonies; publishes <i>L5 News</i> (12x/yr), offers legislative information service, products, holds national annual meeting plus many regional and local activities
Maryland Alliance for Space Colonization (g)	3112 Student Union University of Maryland College Park, MD 20742 (301) 454-4234	Gary Barnhard	Gary Barnhard	educational	1977	\$3,000	\$2 student \$5 regular (c)	700	in spite of name, involved in all aspects of space futures; sponsors annual spring Space/Futures Week, publishes <i>Outlook</i> newsletter, holds weekly meetings
National Action Committee for Space	P.O. Box 50011 Washington, D.C. 20004 (301) 431-0115	Ken McCormick	Ken McCormick	lobbying	1978	< \$1,000	\$1.00 regular	500	lobbying, advising the public about upcoming legislation of interest to space; publishes occasional bulletins about issues in which letters from constituents might have some influence on legislation
National Space Club	1629 K St. NW Washington, D.C. 20006 (202) 256-4690	John P. Fredricks	Rory Maher	educational	1957	\$50,000	\$15 regular	700	stimulates the advance of civilian and military applications of rocketry, astronautics, related technology and informs public at large; publishes monthly <i>Newsletter</i> ; MSC, sponsors annual Goddard Memorial Dinner, luncheon meetings, scholarships, awards
National Space Institute	P.O. Box 1420 Arlington, VA 22210 (703) 525-3103	Hugh Downs	Courtney A. Stadd, Program Manager	educational	1975	\$400,000	\$22 regular (c)	22,000	emphasizes mass communications and forums to give large and diverse audiences information about past, current and potential benefits of space developments in all diversity; publishes monthly <i>Insight</i> newsletter, membership includes subscription to <i>Omni</i> , access to information service, national meetings
Niagara University Space Settlement Studies Project	Sociology Dept. Niagara University Niagara Univ., NY 14174 (716) 295-1212 x 552, x508	Stewart Whitney, William E. MacDaniel, Co-Directors	William E. MacDaniel	research, scholarship	1978	< \$1,000	no charge (f)	500 on mailing list	studying the societal aspects of building societies and cultures for space habitats; publishes quarterly <i>Extraterrestrial Society</i>
Organization for the Advancement of Space Industrialization and Settlement (g) (a)	P.O. Box 704 Santa Monica, CA 90406 (213) 374-1381 (msg. machine)	Howard Gluckman	Michael Thai	educational	1978	\$1,500	\$10 student \$15 regular (c)	200	emphasizes necessary steps toward space settlements and beyond, e.g. space shuttle, realistic broad-based space industrialization; publishes monthly <i>OASIS News</i> , holds monthly meetings, occasional seminars, Space Week activities with L.A. Section AIAA, gives space talks to schools and museums
The Planetary Society	1440 New York Drive Altadena, CA 91001 (213) 797-5100	Carl Sagan, President	Louis Friedman, Executive Director	educational	1979	\$250,000 (i)	\$15 regular	(h)	promotes awareness of and creates mechanism for public involvement in planetary exploration and search for extraterrestrial life; publishes bulletin, offers lectures, programs, pictures, mission results, provides seed money for research, data analysis
The Space Foundation	P.O. Box 4 Houston, TX 77001 (713) 864-4400	David Hannah, Jr.	Art Dula, Secretary	research, funding, educational	1979	> \$100,000 (i)	(f) (c)	—	group is a private foundation for funding research in commercial businesses, with special emphasis on projects dealing with recoverable, large-scale space resources in energy and materials

AMERICAN SPACE INTEREST GROUPS continued

NAME	HEADQUARTERS	PRESIDENT OR EXECUTIVE DIRECTOR	INFORMATION CONTACT	TYPE	DATE FOUNDED	ANNUAL BUDGET	MEMBER FEE/ CONTRIBUTION	NO. OF MEMBERS	REMARKS (OBJECTIVES, EMPHASIS, MEMBER BENEFITS)
Space Futures Society (g)	1627 Spruce St. Philadelphia, PA 19103 (215) 732-3306	Richard Bowers	Michael Callabrese	educational	1977	\$5,000	\$5 student \$10 regular (c)	350	Informing the public about space exploration, industrialization and colonization; publishes periodic journal <i>Space Futures Newsletter</i> , holds monthly meetings
Space Research Coordinating Committee (g)	P.O. Box 110 Sherwood, OR 97140 (write only)	Kelth Lofstrom	T.C. Vollum	research	1980	(h)	S.A.S.E. (e)	—	coordination service for amateur researchers in space industrialization and colonization; provides literature searches, abstracts of papers, encourages experimental research, will publish technical journal
Space Studies Institute	P.O. Box 82 Princeton, NJ 08540 (609) 921-0377	Gerard K. O'Neill	Barbara Evans, Director of Administration	research, educational	1977	\$100,000	\$10 regular (c)	2,500	group is a private alternative to government funding of critical space research, emphasizing work on mass driver and other studies of nonterrestrial resources; publishes <i>Subscriber's Newsletter</i> (4x/yr)
Special Interest Group on the Space Sciences	6843 Laurel St. Portage, IN 46368 (write only)	George Day	George Day	educational	1976	< \$1,000	\$2.50 regular	150	Informal subgroup of American Mensa, providing Mensa members a forum for discussions related to astronomy and space; publishes quarterly newsletter. Members must have qualified for Mensa
Stanford Center for Space Development	P.O. Box 7104 Stanford, CA 94305 (415) 497-4331	Michael Simon	Michael Simon	research, educational	1978	\$5,000	no charge (c)	100	does independent research on space industrialization; sponsors quarterly events (symposia, lectures, films, debates on national space issues), holds bi-weekly meetings, publishes newsletter
Strategic Arms Control Organization	P.O. Box 11702-A Palo Alto, CA 94306 (415) 858-1114	Kenneth Largman	Marcy Hartman, Dept. of Info. Svc. S.	educational	1980	\$1.1 million (i)	\$25 regular (f)	—	focuses on international power imbalances posed by development of new space weapon systems and seeks to develop mutually acceptable reliefs; publishes <i>Strategic Arms Control Bulletin</i> (4x/yr), holds national meetings
Sunsat Energy Council	Box 201, 163 Main St. Cold Spring, NY 10516 (914) 265-3579	Peter E. Glaser	Frederick H. Osborn, Jr., Exec. Sec.	research, educational	1978	\$70,000	\$20 regular (c)	100	fosters exploration and research into solar power satellite concept; publishes <i>Space Solar Power Review</i> (4x/yr), <i>Space Solar Power Bulletin</i> (6x/yr), offers discounts to conferences co-sponsored by Sunsat
United States Space Education Association	746 Turnpike Rd. Elizabethtown, PA 17022 (717) 367-3285	Stephen M. Coughlin	Robert A. Preston, Jr., Secretary-Treasurer	educational	1973	\$6,000	\$9 regular	500	dedicated to promote the peaceful exploration of space through education about benefits of space technology; publishes monthly <i>Space Age Times</i> , offers space covers for sale to philatelists, lectures, trips, tours, exhibits
University of California Space Working Group	Space Sciences Laboratory University of California Berkeley, CA 94720	Joseph Miller	Joseph Miller, Director	research, educational	1979	\$10,000	no charge (f)	60	sponsors Univ. of Calif. student and faculty research in space resources and settlement (e.g. continued study of liquid oxygen produced from lunar soil, and development of a space policy for California); publishes occasional newsletter on work for its supporters
World Space Center	221 W. Carrillo St. Santa Barbara, CA 93101 (805) 965-7947	Siamak Khorram, Univ. of North Carolina	James Bennett, Coordinator	research, educational	1978	\$10,000	\$10 regular (c)	150	provides on nonprofit basis services that can help developing countries build new capabilities in remote sensing, telecommunications, etc., publishes <i>World Space News</i> (6x/yr), and occasional project bulletins, reports (e.g. reducing launch costs to orbit)
World Space Federation (a)	13252 Manchester Grandview, MO 64030 (816) 966-9553	Carol Nevins	Carol Nevins, President P.O. Box 293 Grandview, MO 64030	educational	1979	\$6,000	\$25 student \$50 regular (c)	90	is setting up lines of communication between space interest groups, tourist societies, educators, students, astronomical societies, science-fiction fan network, etc., to encourage closer cooperation between pro-space supporters; publishes newsletter, holds monthly meetings in Kansas City area, holds benefits with health charities (e.g. Cystic Fibrosis Fund)
World Space Foundation	P.O. Box Y So. Pasadena, CA 91030 (213) 441-2630	Robert L. Staehle	Timothy Bauer, Secretary	research, funding	1979	\$300,000	\$20 regular (c)	1,000	provides funding to accelerate space technology development and exploration by conducting technical projects (e.g. solar sail), publishes quarterly newsletter and status bulletins on ongoing projects; members may specify projects they wish to support

Footnotes to table of American Space Interest Groups

(a) has regional sections or chapters, frequently centered in larger cities; write to headquarters for local contacts
(b) tiered membership structure, with different levels (and perhaps different fees) dependent on professional qualifications
(c) support is tax-deductible as a charitable contribution

(d) support qualifies for a 50 percent tax credit on a contribution of up to \$200
(e) does not accept individual memberships
(f) not primarily a membership organization, although donations are accepted
(g) US Society affiliate, but scope of its activities make it of wider than local interest
(h) group is so new that question is not applicable
(i) projected estimate only

Space Activists

(continued from page 21)

becoming more political." Newest on the scene is the first citizens space political action committee: the Campaign for Space PAC founded in March. It was followed in May by the Citizens for Space PAC. Both plan to endorse and support space-positive candidates up for election, particularly in heated races where a narrow margin could make the difference between winning and losing.

Geographical distribution: From the addresses of the groups' headquarters, there are some striking trends. Fully one-third of them are based in the Washington, D.C. area. Another third are based in California. The remainder are scattered over the rest of the U.S. The Washington area has been a home for

support groups are about the same size as most of the trade/professional societies.

In terms of membership, one cannot actually add the total number of members and come up with the total number of people involved in space-interest groups. Especially in the citizen-support category, it is not at all unusual for a person to be a member of three or four space-interest groups. But that overlap reveals something even more meaningful about citizen-support groups: If a person is a member of, say, the National Space Institute, the L5 Society, and the Space Studies Institute (not at all an unusual combination), that person is writing checks for an annual total of \$52 in dues. That's a dollar a week to support his or her interest in space. So even though the number of individual people involved in space interest groups may be as low as half the apparent

million.

Other evidence for a growing positive attitude toward space in popular culture McWilliams cited were hit movies such as *Star Wars*, *Close Encounters of the Third Kind* and *Star Trek*, television shows such as *Battlestar Galactica* and *Buck Rogers*, and toys and electronic games, all multimillion-dollar business showing "an increased trend toward entertainment based on outer space scenarios." In the words of Gilbert V. Levin, President of Biospherics, Inc., and a designer of the labeled-release experiment on the Viking landers, "The people are voting every time they go to the box office."

McWilliams also compared the characteristics of people favorable to space with those who tended to support the civil rights movement, feminist movement and student activities in the 1960s, and found many similarities in attitudes and beliefs. "Evidence such as this," he concluded, "suggests strongly that the minority of Americans who wish to see more federal money allocated to space exploration are the sort of people who compose social movements." However, he warns, much more than simple common interest is required to develop a viable social force. There also needs to be a differentiation of roles, a distribution of power, influence and authority, and organized strategy and tactics. Interviews indicate that within the citizen-support space-interest movements, the necessity for all these additional factors is dawning.

In terms of differentiation of roles and distribution of authority, environmental groups and certain politically conservative societies have come to feel that there is always room for one more group—that no single group can or should do everything, and that each group fills a unique "niche" in the "special-interest ecology" because of its constituency, emphasis, or access to people or institutions. In the citizen-support space-interest movement, however, some major groups have experienced dissension and infighting, competing with each other to be the leading group or standard-bearer for certain causes.

"Many space enthusiasts have a very developed sense of 'territory,'" observes James S. Logan of Campaign for Space. As a result, they have diluted time and energy in internecine squabbles rather than in working together toward the common goal of rebuilding strong American commitment to space exploration and development. Recent reorganizations in several groups now seem to indicate that groups may be rising above the personality conflicts to look at programs and objectives, and a number of major national groups are beginning to work out informal institutional cooperation. On a local or non-professional level such institutional cooperation is already formally set up, though such consortiums as the Futurian Alliance, the World Space Federation, and the Space Research Coordinating Committee.

In terms of tactics, interviews revealed that some groups are becoming more sophisticated in their approaches to the public. Several of the groups are starting to appeal to

(continued on page 74)

Table 1

	Trade/ Profes.	Citizen Support	Total
Aggregate individual members	39,500	39,900	79,400
Aggregate budgets	\$10.1 million* *excludes AIA	\$4.3 million	\$14.4 million

space-interest groups for decades, and is the home of four out of the seven trade/professional groups. It is a natural site for the headquarters of groups with interest in national political activities. California, however, has become a home for space-interest groups only in the last four years—primarily for grass-roots groups—striking evidence of the seriousness of Californians to develop their own state space program. Along this line the most significant group to watch is the California Space Institute, which is working through the University of California system.

Budgets and membership. Analysis of budgets is particularly crucial because it is a measure of how much people are putting money where their mouths are. Table 1 gives the breakdown.

The aggregate budget of the trade/professional groups is probably several million dollars too low because of the undisclosed budget of the Aerospace Industries Association. The citizen-support category is likewise about half a million dollars too low.

There are several highly interesting observations here. Citizen-support groups tend to think of themselves as being small because they are grass-roots. Many are. But what drives up the aggregate budget of the trade/professional societies are the budgets of the AIAA, the USRA (and the AIA)—the latter two of which are consortiums of whole organizations. Moreover, the budgets of the citizen-support groups are sometimes deceptively low, because they do not reflect the monetary value of volunteer labor and access to borrowed or donated equipment. In comparing the bulk of the groups—including one other consortium (the Geosat Committee)—it becomes clear that the larger citizen-

total, if one divides that into the average of the groups' membership fee the per-capita contribution of each to space is an average of \$31 per year.

What does it all mean? According to a report in the February 2, 1979 issue of *The New York Times*, "organized environmentalist groups in the United States are estimated to number as many as 20,000 with more than four million members and aggregate income of \$1.5 million a week." On all levels it therefore seems as though the citizen-support space-interest movement is about five percent the size of the environmental movement, which is now more than 15 years old and mature. But is it even accurate to apply the term "movement" to current American public interest in space?

Evidence in favor of a budding pro-space social movement was presented in a paper by Robert D. McWilliams, now of the Virginia Polytechnic Institute and State University at Blacksburg, Va., at the Fourth Princeton/AIAA Conference on Space Manufacturing Facilities in May, 1979. In his paper McWilliams reported that according to an annual survey by the National Opinion Research Center at the University of Chicago since 1973, popular support of the space program declined from its climax in 1969 to an all-time low in 1975 and 1976, and then started to rise again. In 1975 some 60 percent of the population felt that the amount of money being spent on space was too great and only 7.4 percent felt it was too little. By 1978 (the latest year for which statistics were available as of May, 1980) those figures had changed to 47.2 percent and 11.6 percent. To McWilliams that meant that pro-space constituents in the U.S. could number some 25

WANTED

BY THE
ISB

KIDNAP, ASSAULT THE RANDOR SISTERS: LINX AND ENID



Two Dimensional Bureau
Schematic Front Face



Two Dimensional Bureau
Schematic Side Face

DESCRIPTION:

ORIGIN: Planet Delta, Quadrant 14
HEIGHT: 5 ft. 9 in. (Linx) and 5 ft. 7 in. (Enid)
WEIGHT: Unknown
AGE: Unknown
COLOR OF EYES: Lavender
COLOR OF HAIR: None
MOST PROMINENT SURFACE COLOR: Lavender and Yellow
RACE: Deltan
DISTINGUISHING CHARACTERISTICS: The Randor sisters are humanoid type Deltans. They possess no hair and no ears, have a tendency to expose their bodies and are obsessed with sex.

REMARKS: Linx and Enid Randor, of the Planet Delta (Quad. 14), are notorious throughout their

space sector for their illegal sexual activities. Since first appearing on the ISB Most Wanted list two years ago, they have successfully kidnapped some 120 males of 15 different species of lifeform and forced them into joining an intergalactic male prostitution ring.

Linx and Enid, manning a well-kept warship, attack their would-be victims in the remotest regions of their quadrant. Overpowering their prey's ship, they invade the vessel and kidnap the choicest males on board. Any and all crewmembers deemed not suitable for the Randors' racket are set adrift in space; either to die a slow death or to be picked up by a passing rescue ship. The chosen males are personally used by the two sisters before being passed on to the stud service.

CAUTION:

DESPITE THEIR BIZARRE LIFESTYLE AND EXOTIC LOOK, THE RANDOR SISTERS ARE EXCEEDINGLY ATTRACTIVE IN HUMANOID TERMS. THEY ARE ALSO KNOWN TO BE PERSUASIVE. SHOULD ANY HUMANOID MALE HAPPEN ACROSS THEM, RUN, DO NOT WALK TO YOUR NEAREST ISB OFFICE. UNDER NO CIRCUMSTANCES CHANCE A CONVERSATION.

An Intergalactic League of Worlds Warrant was issued on February 5, 2480 at ISM HQ 14, charging Linx and Enid Randor with 120 counts of Kidnap and Assault, violations of Bureau Statutes 80 (see: private citizen, abduction of) and 107 (see: private citizen, manhandling of).

IF YOU HAVE ANY INFORMATION CONCERNING THE RANDOR SISTERS, PLEASE NOTIFY YOUR LOCAL ISB OFFICE. VISOPHONE NUMBERS AND LOCATIONS OF ALL ISB OFFICES LISTED ON BACK.

ADAM HAWKINS

Adam Hawkins

INTERGALACTIC SECURITY BUREAU
QUADRANT 4, TERRAN DISTRICTS
NEW WASHINGTON COLONY
VISOPHONE 23120019





Shaw's 80



Super Sail

The Wind Solution

By JACK IMES, JR.

The high cost of oil has prompted a new vision for the next generation of commercial cargo ships. Naval architects, aerospace engineers and maritime agencies are exploring the potential of wind to power a modern breed of sailing vessel. Built with advanced technology, the new "Windjammers" would offer an economic and pollution-free alternative to fossil-fueled ships.

The U.S. Department of Commerce has taken an active interest in a sail revival. Recently the Maritime Administration, a branch of Commerce, awarded a \$138,840 contract to the Wind Ship Development Corp. to study sail feasibility toward the American merchant fleet.

"With the continued escalation in the price of fuel, we believe it's time for another look," said a Commerce spokesman. His words un-

derscored the hard economic reality in the search for alternatives.

Modern wind-powered cargo ships would profit from the explosion of technology since 1880s. The new elements of design include synthetic weather-resistant sail fabrics, advanced aerodynamics, friction-reducing hull coatings, global weather satellites and computer controls.

But can sail technology meet the requirements for large commercial cargo ships?

Last year, London's respected Royal Institution of Naval Architects looked for practical answers. The RINA symposium, attended by 100 invited delegates, was international in scope. The many innovations discussed revealed that commercial wind-powered ships had reached advance stages of development.

The Prolss Dynaship

The Dynaship may be the most promising of all new ship proposals. Invented by Wilhelm Prolss of Germany, the Dynaship is the result of 20 years of research and applied aerodynamic science.

The six-masted cargo ship uses a unique "airfoil" design to use the sail area more efficiently. Unlike traditional sails, the Dynaship uses specially shaped sails to cut the windstream like a high-performance aircraft wing. This approach is a major departure from normal ship design. Even the sail unfurling is unique—the dacron cloth extends *horizontally* from the mast along the aerodynamically curved yardarms. The entire operation is automated by hydraulic motors and computers.

Unlike its clipper forebears, the Dynaship is free of rigging cables. Instead the sails have narrow edge panels that act similar to aircraft

wing ailerons. The panels can be warped by computer controls to angle the entire mast to more favorable directions.

The Prolss concept is being developed commercially by the Dynaship Corporation of California. The company's 38-year-old president, William Warner, hopes to build a prototype within five years. Several versions of the Dynaship are being matched to the dimensions of large oil-powered freighters.

"We think we can take modern technology and make a sail system work on the much larger vessels that are economic at sea today," said Warner. One proposed Prolss ship features a huge 60,000-ton cargo capacity. Even the "standard" Dynaship is big, the hull length over 560 feet and a 17,000-ton cargo bay. Because of the high initial start-up costs for construction, the first generation Dynaship may be a modest four-masted, 5,000-ton ship with two auxiliary gas turbine engines for slack weather.

Studies done at Germany's Hamburg University show that the Dynaship concept could profitably handle standard cargo—grain, ore, coal and fertilizer—along many of the world trade routes. Utilizing windpower, a commercial Dynaship could achieve an immediate 50 percent savings in fuel costs over a fossil-fueled freighter.

The Dynaship is attractive because of its dramatic fuel economy. The kinetic energy of the wind is freely available and non-polluting. Other energy options—nuclear, solar and NASA-developed liquid methane conversion systems—are either impractical or too expensive for cargo ship applications. By tapping the wind energy, the Dynaship could be the economic and environmental success story of

the near-future.

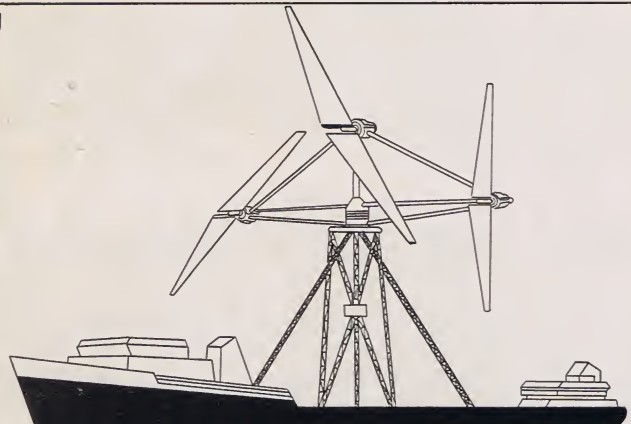
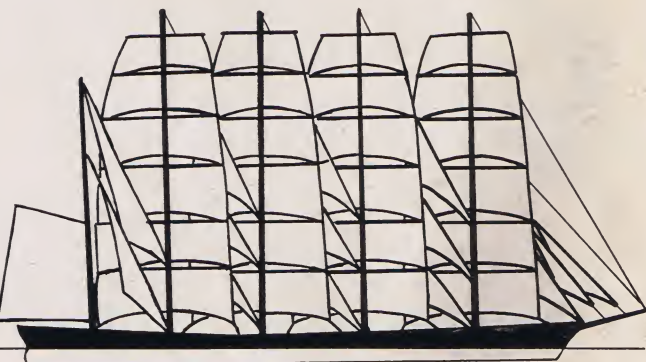
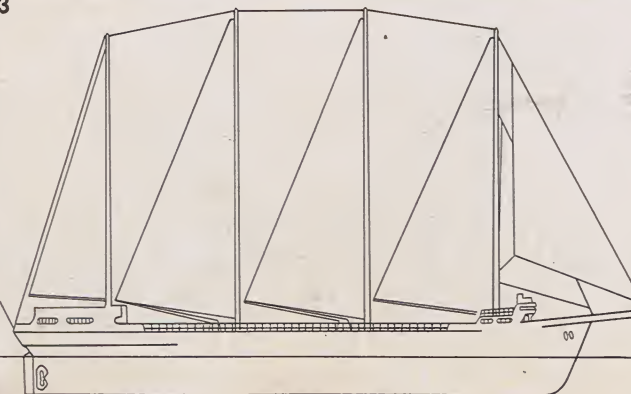
The Windmill Ship

Improved engineering has produced a number of "non-sail" approaches to harnessing wind energy. The Windmill Ship proposal is based on the proven performance of large windmills for power.

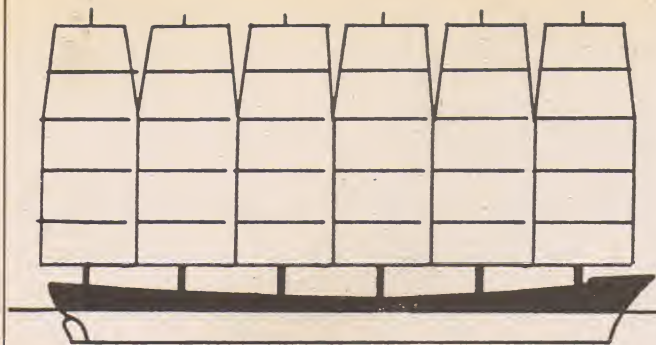
On land, windmills have long been used to generate mechanical and electrical power. The U.S. Department of Energy is committed to developing high-power generator windmills to offset oil costs. At the NASA-Lewis Research Center near Sandusky, Ohio, engineers have developed giant 125-foot diameter windmills that can produce over 100 kilowatts—enough energy to power 30 homes.

Applying such land-based concepts to seagoing vessels may seem absurd, but the idea has merited serious study by naval architects and aerospace designers. One proposed windmill ship offered at the RINA symposium used a single-masted windmill geared to drive the ship's underwater propellers. The giant windmill, with blades 152 yards across, can be adapted to drive electric engines as well. The problem of shifting winds would be solved by swivel mounting the single or multi-rotor windmill on the deck tower platform.

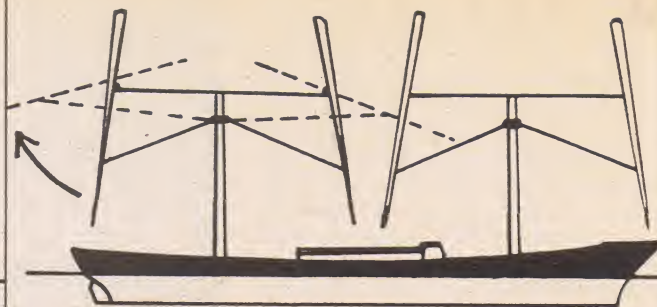
Another proposed RINA design exchanges the upright rotor for a horizontal arrangement. The "flat" windmill allows the wind to spin the helicopter-like blades to create lifting force. Instead of moving the ship forward, the giant "autogyro" lifts the ship and reduces the weight of the load. Less weight means less fuel consumed by the ship's internal oil-fueled engines.

<p>1</p> 	<p>2</p> 
<p>3</p> 	<p>4 Giant multi-rotor windmill ships could use the wind to drive the ship's underwater propellers.</p> <p>5 The <i>Windrose</i>, a five-masted, square-sail ship, is based on the square-rigger ships of the past.</p> <p>6 The <i>Western Flyer</i>, designed and developed by the Ocean Carriers Corp., will be used for small cargos.</p> <p>7 The Prolss Dynaships, using modern aerodynamic technology, may be the cargo ships of the future.</p> <p>8 This horizontal arrangement of windmills would "lift" the ship out of the water, thus saving fuel.</p> <p>9 Sail-wing ships would use rigid air foils rather than the traditional sail to catch the wind.</p>

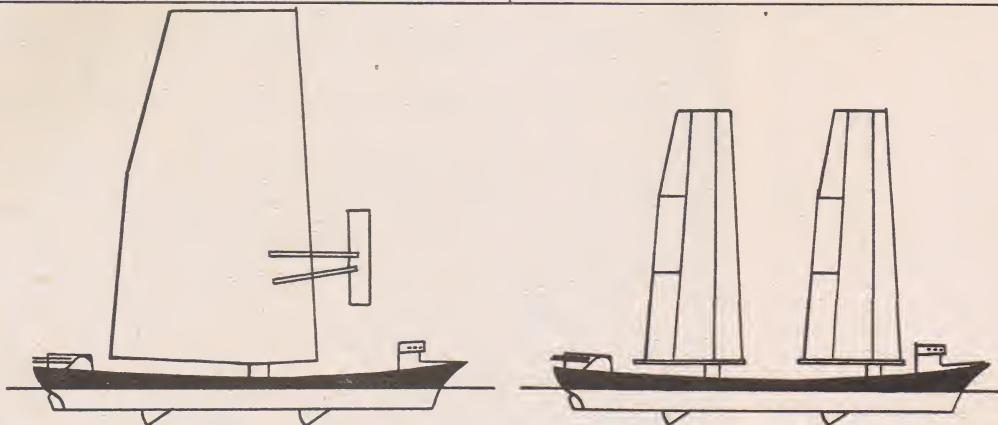
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ART © 1980 JACK IMES

The Flettner Rotorship

The rotorship is another land-based wind turbine idea that uses high-energy vertical-axis cylinder rotors instead of sails. The Flettner cylinders benefit from an aerodynamic principle known as the Magnus Effect—in the windstream, the spinning motor-driven rotor generates a force that can move the entire rotor and mounting. This strong directional force can be applied to ships for driving the hull forward. The spinning rotor can also generate auxiliary power for other ship systems.

Vertical-axis cylinder turbines have one major advantage over other wind systems: they do not have to be turned into the wind. This remarkable asset reduces the complexity of a windmill structure and support towers. Additional support towers are unnecessary because the turbine center shaft doubles as the cylinder's primary support.

The Flettner Rotorship concept dates back to the 1920s. An early experimental ship, the *Buckau*, made a transatlantic voyage in 1925 to prove the Flettner a workable system. But cheap and abundant oil supplies left the rotorship a scientific toy until now. The system is promising, but considerable research is needed before a large commercial freighter can be designed. The vertical Flettner is capable of good performance even in light winds. The ship could offer excellent maneuverability in restricted waterways and inland ports.

The Flettner Rotorship and other vertical wind turbine vessels are being studied by the British Department of Industry. With such governmental support, the rotorship design may make a commercial return to the sea lanes.

The Square-Rigger 2001

While such "exotic" systems as windmills and Flettner rotors have merit, none compare to the unfurled beauty of the elegant *Windrose*. The five-masted, square-sail ship, designed by England's Capt. R. N. Willoughby, is based on the most efficient square-rigger sailing ships of the past. With a hull longer than one and a half football fields, the proposed \$14 million ship would carry over 12,000 tons of cargo at low rates. Because of the classic grace, the *Windrose* could also serve double-duty as a passenger "sail-liner."

The ship is to be equipped with auxiliary diesel engines for calm weather. A predicted speed of 22 knots (34 m.p.h.) would make the *Windrose* the swiftest sailing ship afloat. By comparison, a modern freighter usually runs at an "economic" slow 10 to 15 knots. With sophisticated electronic navigational equipment and computer links to weather satellites, the *Windrose* could avoid the delays and seasonal problems that troubled yesteryear's sailing ships.

Capt. Willoughby's dream ship has the worldwide interest of future-minded shipbuilders. Negotiations are under way in Europe to fund the *Windrose* and return the ultimate square-rigger to the high seas.

The Small Cargo Schooner


The California-based Ocean Carriers Corporation has designed a small sailing cargo ship to compete in trade routes abandoned by the larger, more volume-oriented commercial freighters. OCC's *Western Flyer* has four large A-shaped sails as well as an auxiliary engine. In development since 1975, the ship requires a crew of 16—no more than that of a conventional ship.

With a cargo capacity of 4,500 tons, the *Western Flyer* would compete as a specialized "mini-bulk" freighter. The majority of the world's bulk cargo ships are in the 15,000-ton range and up. Competition for this large volume trade is savage and economics demand that freighters contract for as large a cargo as possible. The *Western Flyer* would cover smaller customer loads whose low amount of dockside cargo doesn't justify diverting a large freighter to pick it up. In this light, the small cargo capacity of the *Western Flyer* sailing ship is seen as profitable plus, rather than a drawback.

★ ★ ★ ★

It is a paradox of history that an advancing oil technology doomed the great sailing era of the 1880s and now has caused a resurrection of the wind-powered ship. Structural design, new materials, electronics and communications can now be applied to developing alternative ships that are light years ahead of the Tall Ships of the past. While it is doubtful that commercial shippers would return to sail on a large scale, the obvious advantages of sail ships cannot be overlooked.

The trend to higher oil prices will make sail even more attractive. To quote one recent study, "The dramatic increase that has taken place in the cost of ship's fuel has led to the present situation where a sailing ship would cost less to run than a powered vessel of similar size—in fact, the sailing ship would be competitive with powered vessels of more than double its size."

The wind solution is not a total one, but the far-reaching vision of unfurled sails cannot be denied. With the economic and environmental factors on its side, the future of sail is brighter than ever. 

Jack Williamson was born April 29, 1908, in Bisbee, Arizona Territory, to pioneering parents. In 1915 they moved by covered wagon to a sandhill homestead in eastern New Mexico, where he grew up in a rather severe natural environment. The turning point of his youth was the discovery of Hugo Gernsback's new *Amazing Stories*, which opened an escape from dust storms and drought into the more exciting worlds of science fiction. Williamson began writing before he entered college and dropped out before graduation because the courses had little to do with science fiction. For many years, he made a sort of living as a freelance writer. As an Army Forces weather forecaster, he reached the Northern Solomons in 1945. Back in New Mexico after the war, he married an old school friend, Blanche Slaten Harp, and settled in Portales. Returning to science fiction from a newspaper job, he found book markets opening. In the early 1950s, Williamson created a comic strip, "Beyond Mars," which ran for three years in the New York Sunday News.

Williamson returned to college when the comic strip expired, receiving a B.A. and M.A. from Eastern New Mexico University in 1957 and teaching English there from 1960 until his retirement in 1977. He received a PhD from the University of Colorado in 1964, writing a dissertation that later became a book, *H.G. Wells: Critic of Progress*. His teaching fields included modern fiction, literary criticism, and linguistics.

Williamson was a pioneer teacher of science fiction. Active in its establishment as a legitimate academic subject, he gathered and published a descriptive list of some 500 college-level courses, *Teaching Science Fiction*. In this regard, he has spent the last several years speaking and writing to promote science fiction as an academic subject.

Writing more or less steadily since his first sale in 1928, Williamson has published more than three million words of magazine science fiction and 30-odd books, with total sales well above two million copies. His novels have been translated into languages ranging from the Scandinavian to Japanese. Williamson has penned many science fiction classics, but is perhaps best known for such works as: *The Legion of Space*, *Darker Than You Think*, *The Humanoids*, *Seetee Ship*, *Dome Around America*, *Star Bridge* (with James Gunn), *Star Child* (with Frederik Pohl), *The Pandora Effect*, *Rogue Star* (with Frederik Pohl), *The Moon Children*, and *The Farthest Star* (with Frederik Pohl), among others. His most recent novel is *Brother to Demons*, *Brother to Gods*.

Jack Williamson has won a variety of honors and awards, including: the *Science Fiction Hall of Fame Award*, from *First Fandom*, in 1968; the *Pilgrim Award*, from the *Science Fiction Research Association*, in 1973; and the *Grand Master Nebula*, "for lifetime achievement," from the *Science Fiction Writers of America*, in 1976. He was *Guest of Honor* at the *Thirty-Fifth World Science Fiction Convention* at Miami,

JACK WILLIAMSON

The noted science fiction author reflects on his 50 years in the genre

By JEFFREY ELLIOT



PHOTO MIKE SLINKER

Florida, in 1977. Retired from active teaching, though not from writing, Williamson is *Distinguished Research Professor in English* at Eastern New Mexico University, as well as a member of the *New Mexico Humanities Council*.

Can you recall the moment when you first discovered science fiction?

I was always fascinated by the accidental bits of science fiction and fantasy I happened to stumble on: *The Red Fairy Book*, Poe's short stories, a stray copy of Bulwer-Lytton's *The Coming Race*. I once saw a copy of *Weird Tales* on a newsstand and was fascinated by the cover, but I had no money and my father had a dim view of such stuff. He told me once, after I had been captivated by *Amazing Stories*, that he felt such things

were mentally unhealthy. A friend of mine, a radio amateur, loaned me a sample copy of the November, 1926 issue of *Amazing*. The cover showed the ark in *The Second Deluge* by Garrett P. Serviss. I was interested, but not really hooked. Later, I saw an ad in *The Pathfinder*, a little farm magazine we took, that offered free samples. I wrote for one and received the issue for March, 1927. The cover showed the Jovian space ship taking off in "The Green Splotches" by T.S. Stribling. The contents included A. Merritt's "The People of the Pit" and the second part of Edgar Rice Burroughs' *The Land That Time Forgot*. I was hooked. With help from my sister Jo, I raised funds to subscribe. The subscription began with the May issue, and the second part of "The Moon Pool," which enchanted me all over again. I was already trying to write. I got an honorable mention in

a contest, I think in *The American Boy*, for a short-short story based on an idea that later grew into *The Green Girl*.

What was the state of the science fiction field at the time you broke into print? How was the genre viewed by the public? What were the leading publications?

When I broke in there was only one magazine that I knew about—*Amazing Stories*—first published in 1926 by Hugo Gernsback. He called the contents “science-fiction”; he invented the term “science fiction” in 1929 when he had lost *Amazing* and was launching *Science Wonder Stories*. *Weird Tales* was already publishing the science fiction of Edmond Hamilton and others as “weird-scientific tales.” Such general pulps as *Argosy* were running the science fiction of Burroughs and Merritt and others as “different stories.” But I wasn’t aware of them. *Amazing* was the only market I knew until Gernsback started *Science Wonder Stories* in 1929 and Harry Bates began editing *Astounding Stories of Super-Science* for the Clayton chain in 1930. *Amazing* paid half a cent a word generally, three quarters of a cent for *Birth of a New Republic*, which I wrote with Dr. Miles Breuer. Gernsback paid a little over a quarter of a cent for my first short serial for him, nothing at all for most of my later work for him until J.J. Wildberg, an attorney for the Fiction Guild, collected for me at the half-cent rate Gernsback had been promising, keeping a 20 percent commission—which I was pleased enough to let him earn. The “stars,” of course, were Edgar Rice Burroughs and A. Merritt; Merritt was getting five or six cents a word from *Argosy*. Ray Cummings and George Allan England were other big names. *Amazing* had begun as a reprint magazine, featuring Wells, Poe, Merritt, Burroughs, Cummings, etc. When new writers began to appear, they were mostly novices, like myself, who were trying to learn the art and willing—glad—to be published for nearly nothing. The stuff was pulp, and looked down on or ignored by everybody else.

Speaking of the pulp era, you once observed: “Science fiction has been growing since the war, breaking out of the old pulp ghetto.” What did you mean by that statement? In what ways has the genre changed most significantly since the pulp era? Has it ostensibly overcome its negative image?

The magazines of the '20s and '30s and early '40s were pulps, written and edited and published for the most part for young male readers, often with an avid interest in science and the future, but most of them without yet much education or money or status. *Astounding* had a focus on working technologists, but most of them were still young. The field was misunderstood or ignored or sneered at by everybody outside it. The first thing that happened, I think, was that a lot of readers grew up, gained education and position and made at least a little more money, without outgrowing science fic-

tion. The Futurians are an extreme case, but still more or less typical. From that group of hungry kids, we have Fred Pohl, Don Wollheim, “Doc” Lowndes, Isaac Asimov, Cyril Kornbluth, Damon Knight, and others. A good many fans—Tom Clareson, for example—grew up to become college professors. The results of all this were more skill and sophistication in the writing, a widening audience, a gradual academic acceptance. But I don’t think the negative image has been entirely overcome. This is partly because the academic establishment still belongs to what C.P. Snow calls the “traditional culture.” They see science fiction as part of the “culture of science”—though they tend to deny, with F.R. Leavis, that science represents any culture at all.

You had a long and pleasant association with John Campbell. How would you rate him as an editor? What were his chief strengths and weaknesses? What was he like to work with? How did he view the role of science fiction?

I always admired John Campbell, and I rate him as the biggest influence, second only to Wells, on modern science fiction. As an editor, he knew his science, and he was optimistic about the power of technology to create a finer future. He was innovative. Turning scientific possibility into story form was a habit of mind; when he got to be an editor, he spread these ideas among writers as if sowing seed—he didn’t mind giving the same idea to a dozen writers, because he said the stories would all be different. One weakness, I suppose, was his uncritical acceptance of what I would call “crackpot” ideas—Dianetics, the Dean drive, Rhine’s ESP, etc. In later years, he was accused of bigotry and racism, but his attitudes there were simply those of his time. He was proud of his Scotch name and blood. He clung to his expansive notions of man’s future after they had begun to go out of fashion.

I knew him fairly well, but we were not intimate friends. He took me to lunch now and then when I was in New York, took me out to New Jersey as a house guest several times. He was—in a way, like Gernsback—fascinated with science and gadgets. His basement was full of electronic gear. He talked about his technological interests, almost obsessively. I found his talk almost overwhelming. After a day or so of it, I was glad enough to leave. I never felt he was very warm or sensitive or sympathetic in everyday human relationships.

As to how he viewed science fiction, I suppose he shared my notion that it could be “a searchlight of science.” He had a fine sense of story structure. He wanted ideas, preferably new ones, but wanted them competently dramatized. I never knew much about his dislikes, because my own attitudes and interests were enough like his so that I found him congenial to work with. I liked the ideas he suggested, and he commonly bought the stories I wrote. I’m sure he would have said he disliked futility stories. Yet he cheerfully bought and published my stories about the humanoids. He published “With Folded

Hands” just as I had written it—except that he added the “With” to the title, and suggested that I write “...And Searching Mind.” He surmised that people with hands folded might develop parapsychological powers, but he made no objection to the downbeat ending of the second story (which became “The Humanoids”)—downbeat, at least, as I meant it. I never had any sense that he regarded writers as subordinates.

Did the meager pay you received at the outset of your career ever cause you to question whether you could make ends meet as a science-fiction writer? Did you ever give serious thought to quitting? What gave you the strength to continue in those lean times?

Yes, there was discouragement enough. At one point, I wrote an article titled, “A Freelance Retires,” and sent it to *Writer’s Digest*. Naturally, they didn’t buy it—and obviously I was still writing. Looking for a better career and interested in psychology, I wrote to Dr. Breuer and to another doctor-writer, David H. Keller, about the possibilities in psychiatry. Financially, I learned, it looked impossible. Yet I went back to college—at the University of New Mexico, this time—changing my major from chemistry to psychology. I arrived home after the year there with nine dollars in my pocket and owing the university 40 dollars for board and room. What I did was to buy paper and typewriter ribbons and write *The Legion of Space*. I was never in actual danger of not surviving, because my folks had the ranch. It wasn’t all that profitable, but it was there. I could always go back, do a bit of incidental farm work, and live for nothing until I finished the next story.

To what extent do you consciously strive to be novel or original in your writing? How concerned are you with coming up with previously untapped story ideas? How do you go about generating such new ideas?

I do search for new ideas, but I have no sure way to find them. One way to try is to test deliberate inversions or opposites of something familiar or accepted. I think I’m more likely to come up with a new story idea when my daily routine is somehow broken—by travel, for example. When I had less strongly fixed attachments and location, I used to go to a new place to write a new novel: New York, Santa Fe, Los Angeles. Most of the things I write come from what I’m concerned about at the time. There’s a method of plotting that sometimes works—to begin with some abstract statement, find a conflict in it, find characters to symbolize the conflicting forces, maybe a setting to fit, then let them work it out. My novel *The Power of Blackness*, for instance, began with a setting designed as a sort of thought laboratory for a test of the values of primitivism against those of progress. The startling new idea is perhaps less essential for a novel than for a short story, because a novel designed to explore or dramatize some possibility can grow and suggest its own ending in a way that a short story can-

(continued on page 65)

Scientific Heroes

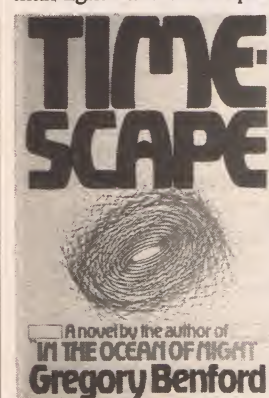
Time

In an archetypal SF epic, just as everything seems doomed, we see the scientist-hero dash madly out of his laboratory with a world-saving gadget clutched in his arms. Rarely are we aware of the all-too-likely possibility that in the real world of science this dash might be stopped for want of a funding grant or a couple of lab assistants—that in the real world of science, short-sightedness and bureaucratic pettifoggery reign almost as often as the scientific method's heroic logic.

This latter aspect is one that Gregory Benford knows well and has chronicled brilliantly in his newest novel *Timescape* (\$12.95 in hardcover from Simon and Schuster). Benford is an internationally known physicist who teaches at USC at Irvine and has been a visiting fellow at Cambridge. He's also a Nebula Award winner and he combines his knowledge and skills from the two worlds of science and science fiction to produce a mature and moving novel.

In *Timescape*, Benford shows us two times—the 1960s and the 1990s—connected by an inconstant stream of tachyons. These subatomic particles that may travel faster than light have been a puzzle and a fascina-

tion for physicists since the '60s and here we observe one of the most fascinating possibilities of this high-speed particle in action. That is, if the tachyon does exist and travel faster than Einstein's speed limit, then we can use it to



communicate with the past and maybe improve the present.

And the Earth of the 1990s can use a great deal of improvement. A series of ecological catastrophes have doomed the oceans and thus the world. The only hope is for a single team of scientists at Cambridge to contact someone far enough down the timeline to stop this disaster.

The problem here is twofold: The scientific team of the '90s has to struggle to get even the minimum necessary equipment, power and people while Gordon Bernstein, the recipient of this chronological largesse, has to battle the disbelief of his scientific peers at USC at La Jolla. This, say Bernstein's fellows, is not the sort of safe, sound research that a career is made of. You can't even get this stuff published, Gordon.

Fortunately enough for his world, Bern-

stein isn't willing to let this puzzle go unsolved. To him, this news from the future isn't that much stranger than comparing '60s California frenzy to the streets of his native New York City.

Benford's subject—the problems and paradoxes of time—isn't a new one; SF is rife with stories of travels, messages and adventures in time (James P. Hogan's *Thrice Upon a Time* is the most recent example that comes to mind), but here we are shown the human dimension of this struggle. Watching the intellectual adventures of two men in two times trying to do the thing they love—solve an impossible problem in the face of overwhelming obstacles and frustration—makes this a gripping story.

Besides being simply a good story, this book is fascinating for its verisimilitude. Benford and his twin as well as a host of worthies from the physics community make cameo appearances, in both good and bad lights, and under a variety of pseudonyms.

This is the book a lot of Benford's friends and fans have been waiting for. It's a strong story with a striking maturity of style, fully-realized, compelling characters and an exciting new look at the paradoxes of time. With the publication of *Timescape*, Benford establishes himself in the genre's front rank. He'll never have to look back and say "I coulda been a contenda"—he is one.

Gravity

Dr. Robert L. Forward is another California scientist. One of the pioneers in gravitational astronomy, he evidently mails off to his publishers any new ideas that are too far out to attempt demonstrating in the lab.

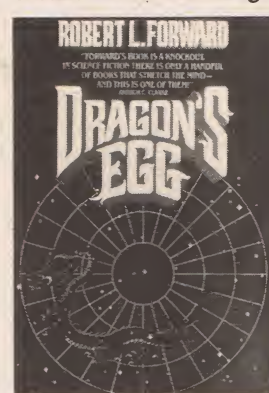
In *Dragon's Egg* (\$9.95 in hardcover from Del Rey/Ballantine), Forward has found something he certainly can't play with in the lab—the cheelas, a race of beings who live on the surface of a neutron star. These tiny creatures live a million times faster than humans, on the surface of a globe 20 kilometers in diameter with a surface gravity 67 billion times that of Earth and a temperature of over 8200°.

Dragon's Egg is the name humanity gives to the stellar corpse where the little folks live. This dead star blasted itself out of its own solar system across a galaxy and is now (November 2049) close enough to the Sol system for the interstellar ark St. George and its international crew to come out and have a look.

Pierre Carnot Niven is the Chief Scientist of this expedition, a best-selling popular science writer and the son of the lady who discovered this wandering star (which wasn't all that easy). On this expedition, though, Pierre hardly has the time to wonder whether

his books are in the *Times* top ten: First, he and his team have to ease into a dance with the 400 million gravities down close to *Dragon's Egg*, and then they have to cope with the amazing notion that time happens much faster for the cheelas.

During their week in orbit around the tiny of world of Egg (as the natives call it), the cheelas move from being able to count one-



two-three and no further to telling the orbiting humans that there are just an awful lot of things that we know now that we just can't tell you—like how to control gravity and how to build a FTL drive. The humans get to

the point where they don't want to sleep for fear of "sleeping through the rise and fall of the Roman Empire."

Most of this book follows the second by second (that's quite a while to a cheela) development of the cheelas from their first use of tools (much like the ape-with-a-bone scene in *2001*) to their first heroic communication with the humans above them. This is fun to watch even if a bit predictable.

The psychology (fear of heights, things overhead and absolute respect of gravity) of Forward's cheelas do recall the Mesklinites of Hal Clement's *Mission of Gravity*, but this world is a much more extreme example of gravity and is the kind of completely realized world that can provide endless fascination for the hard science fan. Plus, the technical appendix offers a real bonus for those folks, explaining exactly how the world works, how the St. George (the ark) and the Dragon Slayer (the ship that works close up) are able to survive the gravity tides and how the cheelas are put together. No one will ever call this book profound, but it certainly is fun.

Computers

Now in some areas, even the cheelas would have to admit that humanity is changing in a real hurry. Take ultracheap computers—microprocessors—for example: When Alvin Toffler penned *Future Shock* just a decade ago he predicted a number of startling changes in society and technology that have since come through right on schedule; he never mentioned micros. Now these little electronic brains are ubiquitous. Everything from toasters to telephones have little computers in them. Does this make Toffler short-

sighted? No, microprocessors didn't even exist when Toffler put pen to paper.

In **The Micro Millennium** (\$10.95 in hardcover from The Viking Press), Christopher Evans chronicles the development of this new technology and makes a good argument for the coming of a Computer Revolution that will be more rapid and radical than the Industrial Revolution.

Evans is aware that computers still are, for too many people, a mystery shrouded in baffling technical jargon. Here he tries (and happily succeeds) in putting this technology, its history and its possibilities in perspective.

The Micro Millennium

This book is about the future. Not some distant future which we can blissfully ignore, but one which is imminent. It will involve a transformation of world society at all levels, and while taking place slowly at first, will gather pace with sudden force. It's a future which is largely molded by a single, startling development in technology. The piece of technology is, of course, the computer.

Christopher Evans

The book begins with a quick, sketchy history of numbers and the machines that manipulate them, treating us to a tour of the roots of modern computers that starts with the first mechanical adder, goes on to Babbage's Analytical Engine, the cryptologists' crude electronic brains of WW II and up to ENIAC, the first general-purpose number-cruncher.

From this base, Evans takes us from the present into the 21st century in easy leaps. This approach, though often used, is difficult to make work without a lot of boring side trips and repetition. In this instance, logic and grace prevail as the author makes even the most surprising changes (a drastic change in our concept of intelligence or the emergence of ultra-intelligent machines) seem likely and his estimation seem almost conservative.

Much of what Evans presents may sound familiar to FUTURE LIFE readers, but this is one of the best, most comprehensive, enthusiastic and, above all, readable examinations of the technology that may have the most revolutionary effect on the future.

Sadly, Mr. Evans will not get to see the developments he predicted. He died in late 1979.

Cybernetics

Writing a book is something that doesn't necessarily happen at high speed. Bruce Sterling finished his first book (*Involution Ocean*) in 1974, and it's taken six long years for his new novel **The Artificial Kid** (\$10.95 in hardcover from Harper & Row) to arrive and give us another look at this intriguing talent.

Here we meet the Artificial Kid, a professional combat artist who videotapes his violent behaviors (all perfectly legal since they're committed in the Decriminalized Zone) and then sells them to an eager and

bloodthirsty public.

The Artificial Kid is his own creation. Once, under another name and with a full set of memories, he ruled Reverie, a world in many ways as artificial as he. Five centuries ago humans arrived here and, after frying much of the surface away with lasers, remade Reverie according to their whim. Artie, as his friends call him, is more whimsical than the planet ever could be. He made himself over into an artist complete with plastic laminated hair, dramatic leather accoutrements, dress black nunchucks, six omnipresent sound and camera globes, a brain wipe and a reborn body.

The Kid and his combative brethren are only one of the oddities of life on Reverie. And the oddities seem to be coming to a peak with the date of the Moses Moses revival coming up. Moses was the planet's founding father who put himself into a cryo-crypt so he could see how everything had come out after a few hundred years. He, like many of the dear departed, is much adored, but no one really expects him to return since someone blew up his monumental crypt a long time ago.

But arrive he does and, with the Artificial Kid as his protector and lovely Saint Anne Twiceborn his first disciple, Moses Moses and company find themselves the target of the ruling Cabal's most ardent wrath. This hot pursuit leads these three into an adventure

across the sea, through the sky on a living cloud and into a terrifically strange jungle before two of them are finally rescued and returned to civilization as heroes of the new revolution.

Sounds like a nice straight adventure story, doesn't it? Well, in Sterling's hands it becomes something else entirely. In this Cook's tour of Reverie's wilds, we learn of the planet's ecological gestalt and how the people here are completely cut off from it. We become aware of the distance that the video which spawned the Kid's career puts between the people and the planet and the people and themselves.

This theme of distance is one of the lovely effects of this atmospheric novel. Sadly, the distance finally gets between the reader and the story. Sterling gives us glimpses of a hundred wonderful people, places and things and gives us an epic trek complete with hardships Jack London would be proud of, then he brings all this to an abrupt and enigmatic close

that leaves the reader feeling like the last line should be "to be continued."

All I can tell you is that I really liked the book but I'm still waiting for the ending.

Space Opera

Do all the above books sound altogether too serious? Has September and the return to the classroom brought on the dread symptoms of literary cafard? Do you dread the printed page and feel like lunging at the first person who offers you another fact or figure in print? Well, fear not, for there is hope. All you need to do is turn off your logic circuits



and indulge in a little imaginative adventuring across the cosmos. Take the space opera cure.

The king of those mindless flights of imagination that lit-crits love to hate is, of course, E.E. "Doc" Smith. When his Skylark series first appeared alongside Buck Rogers' first adventure in a 1928 *Amazing*, it was definitive space opera. And now (once again), you can get the whole Skylark story. **Skylark of Space**, **Skylark of Valeron**, **Skylark Three** and **Skylark Duquesne** (all \$1.95 in paperback from Berkley) follow the adventures of Richard Seaton, scientist-hero extraordinaire, as he wipes out literally dozens of alien menaces in those few moments when he isn't struggling against his nemesis (and much more interesting person) Marc "Blackie" Duquesne.

Smith's secret was speed. Before he started, most SF starred scientist-inventors who took young companions along to do the adventuring while the man in white retired to his lab. Smith's creation of Richard Seaton changed all that. Seaton was both scientist and adventurer; as soon as he cobbled together one of his new superweapons he

jumped into his ship and went off to smite the aliens with it. Now the stories moved so fast that nobody could tell when Smith was doing something ludicrously impossible. And if action at high speed wasn't enough to keep you distracted, the scope of the stories grew so quickly that readers were hard-pressed to keep up. For example, in *Skylark of Space*, the Seatons (yes, he took his wife along, cause somebody had to cook) headed out in their little spaceship for their first adventure and just won a little interplanetary war on the

other side of the galaxy. By the fourth book, their little spaceship was being kept in a closet of their battlestar and they were blowing up whole galaxies by the score.

So, if you're just looking for a good time and a few laughs, enjoy! But be warned that these are just for fun. They are sexist, xenophobic to an absurd degree ("Humanity uber alles," screams Seaton as he rushes into yet another battle), excessively violent (though never very graphic about it) and probably would have been racist if there had ever been

anyone but white folks on the scene. They also exhibit some positive qualities that are often missing in modern fiction—a sense of awe and wonder at the workings of the universe and a hope for a better tomorrow.

So, thrill-seekers, if such a combination appeals, come on along for a look at how the future was supposed to be. And, if you just can't stand these fanciful flights, you can always give them to your cultural anthropology prof as authentic American pulp artifacts. E

Books in Brief

Star Driver by Lee Correy (\$1.95 in paperback from Del Rey/Ballantine). Out-of-work pilot-astronomer Mike Call arrives at a private research laboratory in New England

that has just found a loophole in Newton's Third Law of Motion—an "engine" that creates thrust without the ejection of mass. A "sky hook." Call is hired to test pilot the

system to Mars—a spectacular demonstration of "technological breakthrough that could create a new era on Earth, if only government bureaucracy doesn't bury it, ruthless industrial spies don't steal it or corporate power pushers don't throw it away.

Written in the intriguing gadget-mad style of the '40s and '50s, this SF thriller pits industrial espionage against scientific discovery and the individual mind against the force of a committee. This is author Correy's fourth novel, but he is better known as G. Harry Stine, author and contributor to more than 20 books on science and technology—Correy is his pen name for fiction.

Seasoned with a heavy dose of technological buzz words, the novel will probably bring smiles and groans of recognition to pilots and technicians alike, but should still prove interesting to anyone who is in love with the John Campbell variety of SF that goes "clang."

David Hutchison

A Planet Called Treason by Orson Scott Card (\$2.50 in paperback from Dell). Treason is the name of a planet made up of the descendants of a group of intellectuals who, centuries before, rebelled against something called a "democratic tyranny of the masses" (whatever that is). Each of the rebels, apparently preferring monarchy to democracy, set up a small kingdom in a part of their new colony, and their ancestors now spend their time warring amongst themselves. Genetics being what it is, each of the tribes have rather single-mindedly developed upon their original parent's calling: the children of a geneticist regenerate lost limbs; the children of a geologist talk to rocks, etc.

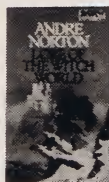
This rambling little novel has something in it to offend almost everyone. For example, the descendants of a black physicist are a violent people who live in trees and use bribery and lying as a way of life. The hero manages to convince everyone, including an apparently intelligent lesbian, that he is female by acting coy and fanatically modest (something rather unlikely for a woman who was supposedly raised in an Amazonian society). But the worst affront of this novel is to literature.

Esther Summerson

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C-4

James L. Cunningham



ART © 1980 JAMES CUNNINGHAM

James L. Cunningham is not your average space art painter. Perhaps this is because his space art is not in any way average. His vivid scenery captures the feel of the cosmos rather than simply portraying its probable realities. Jim is the first to admit this. "Certainly my work is different from that of, say, Robert McCall," he says frankly. "It's more of an abstraction."

A native of Indiana, where he now resides, Cunningham was torn early in his career between


becoming an artist or concentrating on the sciences. "My interest in art won out," he grins, "because mathematics is not one of my strong points."

The two paintings featured in this issue's Gallery are very representative of Cunningham's style. Of "Stellar Nebula," shown above, Jim says, "This painting poetically symbolizes the accretion of planetary bodies out of a stellar nebula. The central forms (distillates of the dynamics involved) float among the nebula. All of the forms are

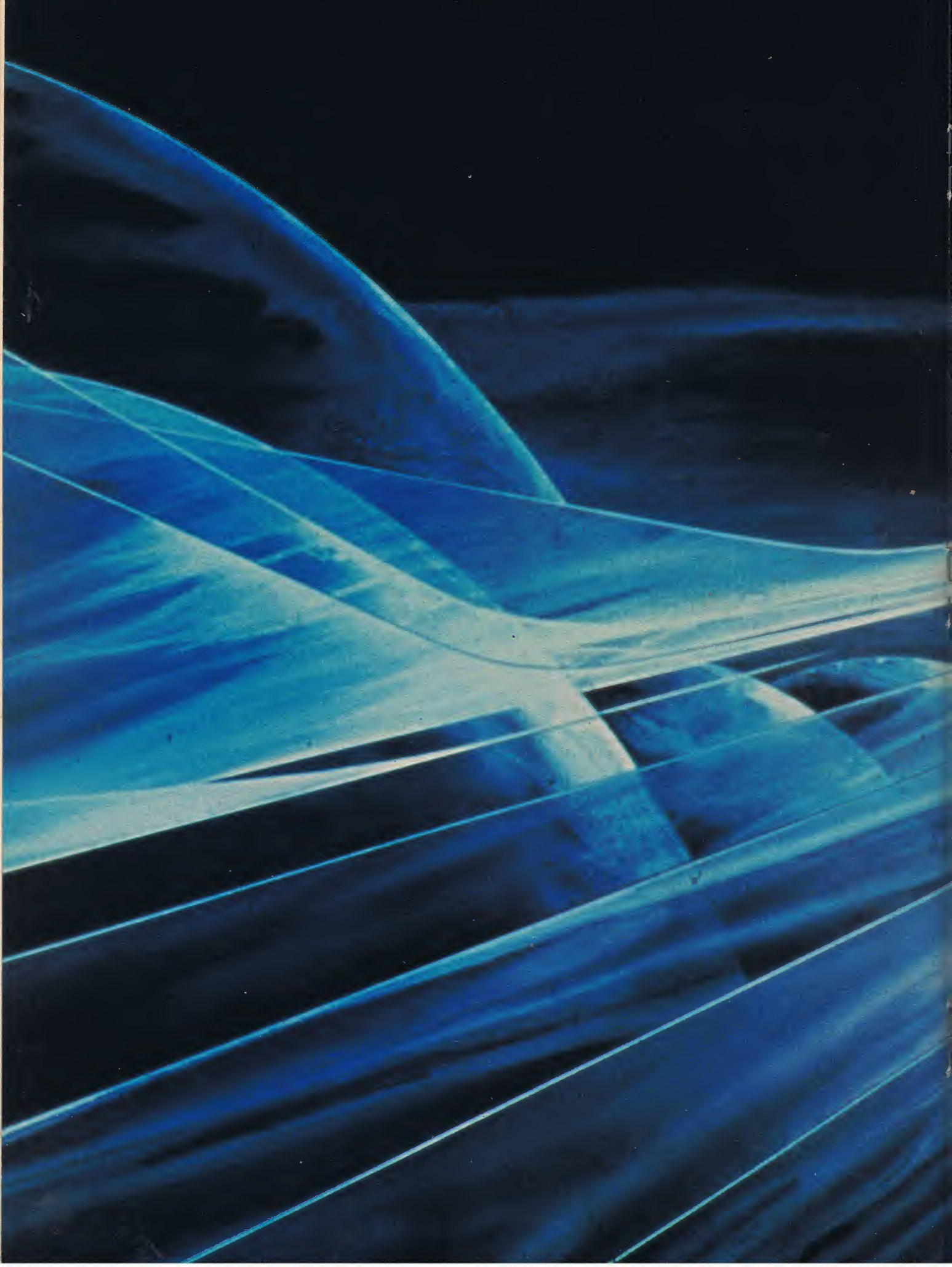
transparent in an attempt to show their transient existence, thereby indicating the passage of time. Non-symmetrical progression of the planet forms from the lower left of the composition to the distant upper right evoke the expression of order in this turbulent process of genesis. The shard-like streamers among the array of planets are a final note in the planetary evolution—they represent the atmospheres that the planets will ultimately form. Their appearance is that of the atmosphere of a planet seen

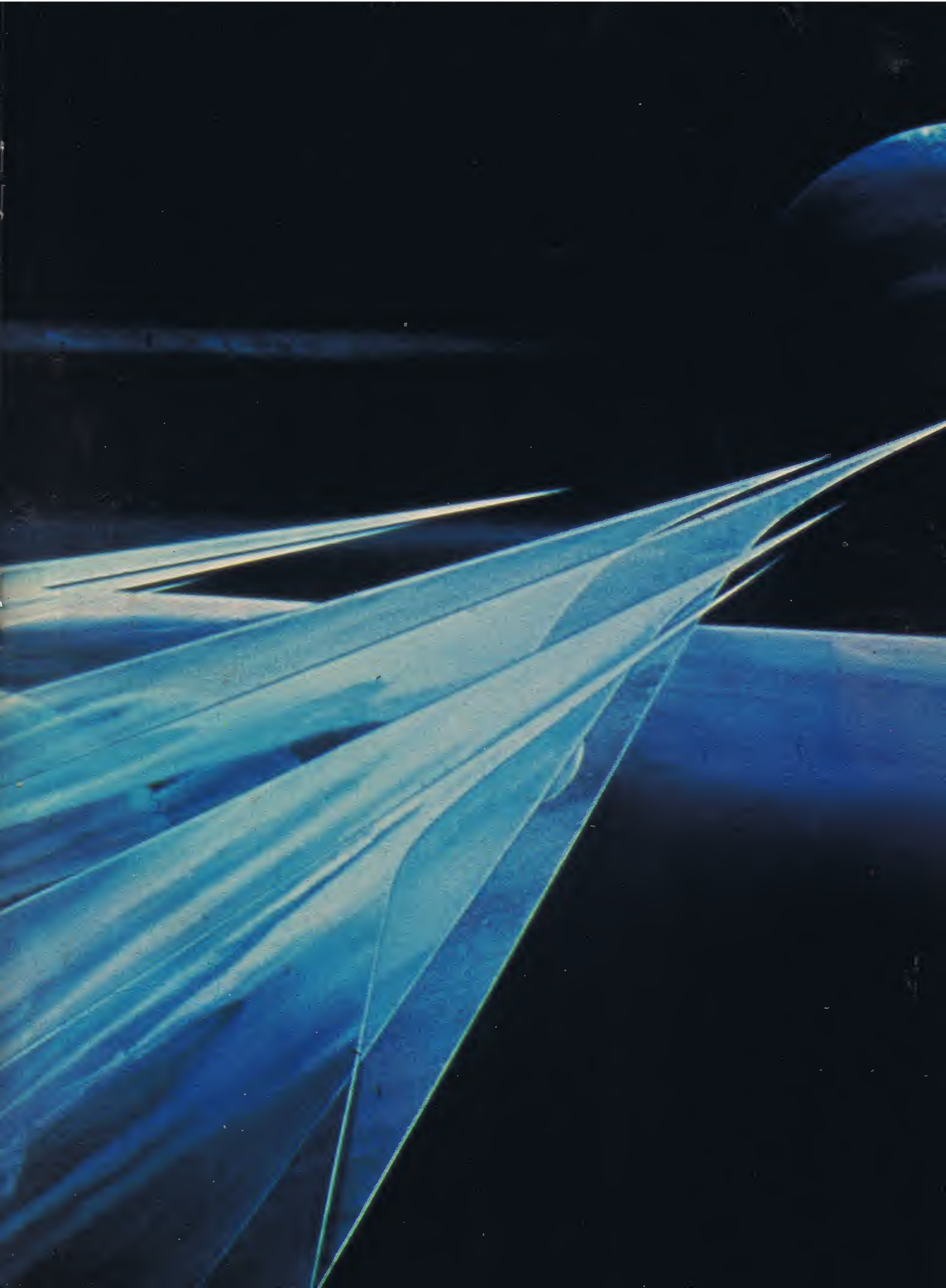
from afar—a planet looked upon from space.

"'Distant Nebula' [center-fold], like 'Stellar Nebula,' deals with planetary evolution and embodies many of the same elements. Here, however, the stellar nebula is a distant memory in the sky above a planetary horizon."

James Cunningham's work can be seen in the Smithsonian Institution, the Indianapolis Museum of Art, Indiana Central University and international exhibitions. 

Centerspread: "Distant Nebula" © 1980 by James L. Cunningham





WARP!

A SUPERHERO SAGA RETURNS TO THE STAGE

By BARBARA KRASNOFF

The story is about a lowly bank teller who becomes god."

Director/creator Stuart Gordon grins as he attempts to describe his multi-media fantasy epic *Warp*, a series of three plays which is currently being reincarnated at Chicago's Apollo Theater Center.

"It started in the fall of '71," he explains. "The Organic Theater is a company of actors who work together on a continuing basis to do original plays. We try to get people to come to the theater who don't normally go. At the time, we were trying to get away from plays where people sat around and talked and smoked cigarettes; trying to do shows that could almost be told with the action alone. Comic books are a natural for that.

"The first idea was just to do a few stories, just act out a few comic books. Then after we started getting involved in it, we said why don't we just do our own comic book? And it was a collaboration really—I asked an old friend of mine, Lenny Kleinfeld (alias Burry St. Edmond) to help in the writing of it because he's a big comic book fan. And the company had a lot of ideas. We really didn't know specific details. We just made them up."

Warp begins as a supposedly cured schizophrenic named David Carson suddenly finds himself transported to the fifth dimension and told that he is actually Lord Cumulus, Avenger of the Universe. From there it gets complicated.

"*Warp* is not a space opera," says Gordon. "It doesn't take place in outer space. It takes place in the fifth dimension. It's more sort of Dr. Strange-oriented than outer space, and hardware is something that isn't used much. The powers that Cumulus has are mental powers. He's able to throw these mind bolts; energy bolts right out of his head."

Our hero is trained by a 35,000-year-old Amazon warrior named Sargon so that he will be ready to combat an evil wizard named Chaos. After a fierce battle, Cumulus finds out, to his dismay, that Chaos is none other than the second half of his personality.

"The whole thing is sort of based on Freudian mythology," explains Gordon. "One of them, Chaos, is really the Id, totally into immediate gratification, and with no sense of morality whatsoever; sort of a superbaby. And then Cumulus is the Superego, someone who is completely concerned about social proprieties, a good guy to the point of being ridiculous. Almost a Dudley Doright character."

Together they face a new villain in the second episode, a sixth dimensional bad guy called Xander (pronounced "Exander") the Unconquerable. "He is a warrior," Stuart

says, "a demon who has totally destroyed the sixth dimension, killed everyone in it, and has now come to the fifth dimension to gain the cosmic cube which holds the secret of all interdimensional travel. He turns out to be much more powerful than either Chaos or Cumulus. The Lord of Knowledge, called Lugulbanza, tells them that the only way they can win is by combining forces." Literally—by forming a single entity (the Ego).

Can Cumulus and Chaos defeat the evil Xander? How do they rescue their father, the ultimate god figure, from his powerful cap-

tor? And what really happened to Sargon? Stay tuned for episode three.

"Originally we were thinking of doing seven shows, where each episode would end with some horrible situation that would make the audience want to come back again and again," Gordon admits. "After we spent all night working on the first episode, we realized that the job was such a monumental one, we decided to scale it down to three."

Spread throughout those three episodes is an impressive array of powerful beings, multi-dimensional monsters and stray mind



Xander the Unconquerable from the Sixth Dimension: the ultimate bad guy.

PHOTO © 1980 TERRY SHAPHO



Left: Cumulus is attacked by a Seventh Dimension monster. Right: He is acknowledged as a hero by Lugulbanza and friends.

bolts, all of which call for a good deal of special effects. "Some of the effects are very simple, and some are kind of complex," Stuart says. "The thing about *Warp* is that the effects are, I would say, as good as the effects in a movie, and what blows people away is seeing them live. Seeing something like that right before your eyes.

"It's the combination of the costumes and the props, everything...Special effects, no matter how good they are, can't really make it on their own. If you believe in the situation being created by the acting and the script, then the special effects have to be good enough to suggest what's going on, and the audience just fills in the rest in their minds."

Warp was a smash success, running exactly a year and a day ("The audience ate it up," says Gordon). The producers decided to bring it to New York, specifically Broadway. This was in February of 1973, about five years before the big media SF boom. "It ran a week," Gordon admits wryly.

"The critics in New York saw it as being, well, *chutzpah*. This group from Chicago coming in and not only opening one show, but attempting to open three. They got a little nasty about it. They were very negative about science fiction. One of them started his review by saying, 'I do not like science fiction, and I have no respect for anyone who does.'" Stuart smiles. "It would be outrageous to think of that happening today. It would be absolutely unheard of for someone to make a statement like that."

In spite of its short Broadway run, Gordon maintains that *Warp* had a strong effect. "As a matter of fact," he says, "there were rumors that are still flying around that George Lucas was in the audience the opening night, and also we know for a fact that David Bowie was there, and members of the group that became Kiss. So that *Warp* had a tremendous impact, I think, on other forms of entertainment. I think a lot of people borrowed very heavily from it. We were using all kinds of things that have since become standard typical effects."

Now *Warp* is once again taking playgoers to the fifth dimension at the Apollo Theater Center (2540 North Lincoln Ave., Chicago, IL 60614; telephone (312) 935-6100).

In the meantime, Lord Cumulus, Aven-

ger of the Universe, will continue to battle evil in the fifth dimension for enthusiastic Chicago audiences. "One of the things about *Warp* is, we get grownups to act like 10-year-old kids at a Saturday matinee. There's a lot of booing and hissing and cheering—the audience gets really involved."

Gordon considers a moment. "I think if there's a reason that *Warp* works so well, it's the basic reason that comic books work so well, which is the idea of, well, Superman. 'I

may just look like I'm a nerd, I may seem like a Clark Kent to you, but in actuality inside of me there is this great godlike presence that is waiting to have the magic words said to make it appear.'

"I think this is something that kids carry with them all of their lives. *Warp* is able to touch that, make them feel it again, so that if the audience acts like 10-year-olds it is because they are able to feel things that they haven't felt since they were children." [E]



Sargon, the Amazon warrior, gets the better of Chaos (right) and his sidekick Symax.



PSYCHEGENICS

Invent Your Own Future And Integrate Your Brain

By BARBARA WECHSLER



DR. WIN WENGER

One "travels" through space or time in an "elevator." This mode of transportation is a fiction meant to aid participants in using their imaginations and, therefore, both sides of their brain.

PAINTING BY
JOHN BERKEY

Win Wenger is a pragmatic traveler in the realm of the imagination. Dr. Wenger, a genial man who is partial to green pullovers, is the inventor of a discipline called Psyche-genics, a way of capturing those valuable but often maddeningly elusive intuitions we all have.

The idea behind Psyche-genics is really quite simple. All of the Psyche-genics techniques are intended to enhance integration between the left and right halves of the brain. It has been theorized that the left side of the human brain is more "linear," while the right side is more visual and holistic. Tests using EEG suggest that insights occur when we use both halves simultaneously. In that case, the more integrated our brain functions, the smarter we would become. According to Dr. Wenger, using both our intuitive and analytical abilities together builds connections across the corpus callosum. Dr. Wenger thinks these connections are a physiological reality, and says he would welcome researchers trying to prove it.

The above may sound rather abstract and vague, but the exercises used in Psyche-genics are very concrete.

If you want to invent something, says Dr. Wenger, the easiest way to do it is to travel to an advanced civilization where you can observe the invention first hand! It's fine to have a goal in mind, such as solving a problem in living, finding an invention, enhancing a creative skill or even visiting another civilization. Dr. Wenger feels there must be thousands of instances of probable civilizations containing solutions to many of our problems.

An imagination explorer who uses Dr. Wenger's techniques must describe precisely and concretely every detail of the imagined world or place visited. To do that, you need to breathe deeply to induce a deeply relaxed, re-

ceptive state. Your guide can then conduct your "trip" by reading from a sort of cookbook Dr. Wenger has put together called *Your Limitless Inventing Machine*.

The instructions for *Beachhead*, a way of establishing "a familiar anchor-point of reference in an advanced civilization," asks the traveler to "go for the form of invention, innovation or discovery which is not so easy to develop with present resources, but which also has the most beneficial results for all affected by it." To get to one of these places, one "travels" through space or time in—an elevator! This interesting mode of transportation is a fiction meant to aid participants in using their imaginations and, therefore, both sides of their brain.

The elevator at your disposal has an *Up-when* button (for travelers to the future), a *Space* button (you guessed it) and a *Downwhen* button (for trips to real or imaginary advanced civilizations of the past). When the elevator door slides open upon arrival, the time/space traveler must describe his *first impression* of what he observes. Pre-conceived ideas play a surprisingly insignificant part in the results of these exercises, which are designed to help us simply *see* and then critically analyze what's there. I pushed the *Upwhen* and *Space* buttons in my elevator (which, incidentally, also must be precisely described). Expecting to see a classically "futuristic" world on my arrival, I was confronted instead with a vast but somehow harmonious hodgepodge of architectural styles, which included a Roman-style piazza, a small group of appealing but decayed brownish-red tenements, and a group of glowing obelisk-like structures on the horizon!

My trip focused on the general appearance and mood of the civilization I visited. For engineers, inventors, and other pragmatic types, Dr. Wenger recommends focusing on

the practical discovery you wish to observe and describing it in minute detail, even going inside the invention to see its inner workings.

In *Your Limitless Inventing Machine*, instructions are also detailed for *Toolbuilder I* and *II*, variations which concentrate on developing methods of education, economic systems, and other pragmatic solutions to problems of social organization. Trips may be to highly improbable futures as well as more likely ones (futurists take note). Why improbable futures? According to Dr. Wenger, "If this present moment is the trunk of a tree, it branches off in many directions. Some branches are thicker, stronger, than others—these are highly *probable* futures. Some are only twigs, highly *improbable* futures, but it is many of these twigs which bear the fruits we are after. Also, if it is a sufficiently *improbable* future that we go look at, visit, experience and bring ideas back from, you are freed from feeling that you have to somehow account for how things *got* to be the way you saw them upwhen, this trip."

To further enhance the innovative process, Dr. Wenger recommends *de-briefing*, a procedure well-suited to working in groups. By switching partners, and describing precisely what we have just experienced, Dr. Wenger claims we further our critical comprehension of what's been observed during the "trip." To make the process even more intense, participants can alternately visit their "beachhead" civilization, de-brief, visit, de-brief. According to Dr. Wenger, "ruthless" application of this process is the best way for engineers, futurists, scientists, and inventors to maximize the practical value of *Beachhead* and *Toolbuilder*. To be accurate, a picture of the future must include "sensory, evocative word pictures." Dr. Wenger has coined the term "principle of description" to sum up the process of making concrete the visual intuitions that are tapped during Psychege-nics exercises.

Dr. Wenger believes that "we talk to ourselves in pictures." He holds a strong conviction that all the information we can benefit by having access to is already stored in the "right parietal lobe of the brain." His current interests in energy-fields, breathing techniques, and intuitive states of consciousness evolved from his work in education (he has his PhD in this field). His first book, *How to Increase Your Intelligence* (Dell, 1975), is a fairly conservative treatise on intelligence-enhancing techniques that gives little hint of how much farther Dr. Wenger's interests would take him. According to Ken Howard, a New York-based photographer who has participated in many of Dr. Wenger's workshops, Dr. Wenger is "really very far out there," expressing an adventurousness in his interests that is belied by his somewhat professorial manner. With Dr. Wenger's techniques, "you have instant access," says Ken Howard, because they are very simple, direct, and easy for the average person to learn. He compared Dr. Wenger's techniques for problem-solving with hypnosis, and said that to teach people how to achieve equally good results with hypnosis would take far longer.

Dr. Dennis Gorgis, a physician and inventor of the Whole Brain Wave Form Synchro-Energizer, a device currently intended for experimental use by physicians and psychologists (it is a "brain-wave integrator and central nervous system integrator"), contributed to the early development of Psychege-nics by helping Dr. Wenger collect data. Dr. Gorgis says that Psychege-nics is "an amalgam of many disciplines." He maintains that the essential value of many of the techniques used in Psychege-nics has already been proven by, for example, "the TM people," and that while Psychege-nics can "change your paradigm," it's "weak in physiological areas." He also feels that Dr. Wenger's techniques



"If it is a sufficiently improbable future that you visit, experience and bring back ideas from, you are freed from the feeling that you have somehow got to account for how things got to be the way you saw them upwhen."

are a valuable contribution to a larger picture, but that Dr. Wenger's approach is too intellectual and "ignores the body." "The key thing in any form of therapy," says Dr. Gorgis, "is to open up more possibilities and choices, and Psychege-nics is one way of opening up choices." Dr. Wenger himself points out that his discipline is only one of many valuable paths.

Another possible criticism of Dr. Wenger's ideas is that his right-brain, left-brain division theory, developed early in his career, is too simple. I asked Dr. Wenger if he was aware of recent brain research which indicates that the right/intuitive, left/analytical division of the brain may not be quite so simple. He replied that he was aware, but that his working hy-

pothesis was good for getting practical results.

"All the creative, bright students I have come across, and all geniuses, have mixed cerebral dominance; the average person has left-brain dominance," says Dr. Wenger. He says he has based his research on "behavioral evidence," but says he would like to see more rigorous scientific investigations into the role of Psychege-nics in brain functions.

Dr. Wenger has mapped out the brain wave states that people are in during his exercises. Trips to the future, to outer space, or to parallel worlds where one can observe how one's alternate self achieves mastery of a skill, are possible in theta (deep relaxation). Dr. Wenger's breathing techniques induce the alpha state of relaxation. Each exercise, he says, is in the "language" of the part of the brain to be tapped.

Dr. Wenger explains that his methods evolved as he practiced his techniques on himself, and claims to have discovered numbers of inventions this way. His more esoteric concerns include analyzing energy fields, which he claims fall into different, palpable frequencies. Dr. Wenger's breathing techniques include—

- "Noise-removal" breathing: Inhaling deeply and symbolically the "noise" and clutter we experience as stress (you can picture the "noise" as swirling leaves) and exhaling it as cleansed energy.
- "Rainbow" breathing: Picturing one's breath as a reddish or orange color which evolves toward violet or blue as it travels up your body; an easy, exhilarating high.
- "Satisfaction" breathing: Experiencing as you inhale the sensation of a pleasantly sensual aroma (vanilla, chocolate, baking bread) or a scent associated with relaxing experiences; a quick vacation from your everyday routine.

Dr. Wenger's smorgasbord of techniques is intended to help people get creative, constructive solutions to problems; to help people become more visual and imaginative; to help managers and technicians enhance their innovative abilities. He estimates that about 300 people a year attend his comprehensive workshops, and that an additional 1,000 attend demonstrations and specialized workshops. While the scientific evidence he is able to offer in support of his ideas is a bit sketchy, his techniques have been of practical value to many different kinds of people. One highly practical young man in Maryland used one of Dr. Wenger's exercises to invent a better screwdriver.

Dr. Wenger's personal odyssey has taken him from teaching in the public schools to teaching people how to explore their minds. The path he has charted combines New Age consciousness, pragmatism, and good old-fashioned American capitalism. A firm opponent of "zero-sum" games, Dr. Wenger is an advocate of enlightened self-interest on the road to the future. □

If you are interested in participating in a *Psychege-nics Workshop*, write to *Psychege-nics*, P.O. Box 332, Gettysburg, MD 20460.

harlan ellison

AN EDGE IN MY VOICE

If this guy was a Director, then I was the reincarnation of Charles Dickens. It was years ago, and he's probably still feeping around in the television graveyard sucking the marrow out of scripts like some hideous Lovecraftian creation, a nameless horror of the coaxial wasteland, so I won't name him.

Wouldn't matter, anyhow. You'd say who?

Which anonymity is probably the most benign justice that could be meted out to a man of such impoverished talent. There were moments, however, when he was allegedly directing a script I'd written, during which I would have appealed to the Revolutionary Council to have his hands or his viewfinder loupe lopped off in the time-honored manner of Islamic justice.

He had raised hell with the producers of the series because I'd written such an exhaustive teleplay: all the camera angles and specific shots detailed for the cinematographer.

But that's the way I work. Always have, since I got to Hollywood in 1962. Never felt that a scenarist was doing the job properly unless the script was written *visually*; and that always meant to me the process of *visualizing* what the camera would see. The process was effectuated by my actually closing my eyes and running the movie in my mind. Then I'd open my eyes and describe in cinematic terminology what I'd seen in the viewing room of my mind.

But the price one commands in this town, whether writer, actor or director, is linked with how much clout one can summon up; and for years now the directors have used the myth of the *auteur* theory as their most powerful negotiating tool. The theory, for those who have been living in a sensory deprivation tank for the last two decades, is one propagated first by the *nouvelle vague* French directors, post-1959. Stripped of superfluous rationalizations, the theory says that the director is the *author* of the film, on the basis of his or her "personal style" brought to bear on the material.

The material, you must understand, is how the original conception, whether novel or short story or original screenplay, is depersonalized in directorial euphemism. Sometimes the dream of the writer is referred to as the "property." (A writer of my acquaintance once stood up at a seminar where a producer was blithely talking about "properties" and denounced him as a fatuous martinet, advising him that she wrote *screenplays* and *stories* and an occasional *novel*. She did not write "properties." "Properties," she snarled, "are empty lots in the San Fernando Valley or condominiums in Malibu! I don't write those!")

But pollution of the language, employed in the service of those building clout translatable

into percentages of gross profits (what we out here call "points" in a deal), is only one of the meretricious expedients used by directors to assume control of a project, to establish the *auteur* clout, to put his or her personal stamp on the creation of a writer.

Most of you actually go for that okeydoke.

Like studio executives and producers in Hollywood, you actually believe the credit line preceding the title of a movie that proclaims it A FILM BY PETER BOGDANOVICH or A FILM BY HAL ASHBY. The Writers Guild has been fighting that form of screen credit for years. They are not films by Bogdanovich or Ashby (to select just a pair of obvious miscreants in this respect); they are films *directed* by Bogdanovich or Ashby. Bogdanovich did not write *Paper Moon*, Alvin Sargent did, from a novel by Joe David Brown titled *Addie Pray*. Hal Ashby didn't write *Harold and Maude*, Colin Higgins did.

But seldom does an audience remember the actual author of a film—and how many of you can remember the name of the writer of a television segment you enjoyed just last night? That serves the end of reducing the writers' creative and economic clout in Hollywood; and it always has. Writers, for the most part, are chattel in the film/tv industry. They have no more say over what happens to a script they've written than a prisoner in Raiford State has over the license plates he stamps out every day.

While that has traditionally been the invidious nature of the industry, for the last twenty years it has been insufferable for writers who give a damn about what they write. (The hacks, the "creative typists" who fill most of those empty hours for primetime, don't give a hoot. The going rate for a sixty-minute teleplay these days is \$9972.00 with a raise expected after the upcoming Writers Guild contract negotiations later this year. Good or bad, inspired or donkeywork, *that's* the rate.)

Insufferable because of the *auteur* theory and the considerable clout directors now possess. We're not discussing here those six directors worldwide who are the best, the six whose individual voices—whether you like their films or not—set them apart from all other directors who are merely craftspersons of greater or lesser ability. . . from, let us say, Spielberg and Walter Hill and Ridley Scott at the pinnacle to, again let us say just as rule of thumb, Eliot Silverstein, Otto Preminger and Irwin Allen in the pits. . . but *all* directors have that clout by implication. The myth has become the reality.

Studio heads who are, for the most part (as Pauline Kael has termed them) businessmen running an art, are the most insecure and superstitious lot one could ever meet. They have no idea whom they can trust because they



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simply do not understand the creative act; and since they cannot read a script—they have assistants read them and prepare one-paragraph synopses—they fear and distrust writers. Treating writers as equals, listening to their ideas of how a film should be made, is about as salutary an idea to a studio executive as taking a ball peen hammer to every mirror in the house.

But directors are the *auteurs*, they believe that. And directors can be wonderful salesmen. They come in with all that freight of *auteur* myth going for them, and they simply dynamite the producers or execs into believing that *they* have the vision. That *they* know just how to revise and reshape and mold and twist and disembowel the script created by a single intellect, to make it a fifty-million grosser.

We're not talking about the six real directors in the world; we're talking about guys so lame they cannot direct themselves to the toilet on the sound stage.

Like the guy who was directing that script of mine years ago, who complained about how fully written it was.

So he conned the producers into believing that he was an *auteur*, this dreary wimp, and he established territorial imperative, and he ignored the shots that might have given the show some vestige of originality, and he restaged most of the shots so they didn't work, and the segment looked like an outtake from *The Terror of Tiny Town*.

But here's the part that convulsed me.

The story took place in 1888, in the American West. I had extrapolated history of the period and come up with the not implausible concept that Jack the Ripper, having ceased

(continued from page 66)

For composer and synthesist Patrick Gleeson, the future looks very rosy indeed. Unfortunately, this happy state of affairs hasn't always been the case. Twelve short years ago, Pat was a very unhappy man, "a square peg in a round hole" as he terms it today. As a youngster his consuming passion was music, but somewhere along the road to adulthood things went awry. "Where I grew up," he recalls, "in an Irish-Catholic middle-class ghetto of Seattle, a young man didn't pursue a career in music—it just wasn't done." So Pat allowed music to take a back seat to more acceptable pursuits, finding himself some years later teaching English at a California college. Though a good job by conventional standards, Pat felt unfulfilled and miserable. So, at the age of 33, when most people are settled comfortably in the career of their choice, Pat quit his job to become a musician. "Everybody—even my wife—told me I was crazy to give up this nice teaching position, but I knew what I had to do." For a while, it looked like those people were perhaps correct. Success was neither immediate nor easily come by, and only now, after more than a decade of hard work, does Pat find himself poised at the threshold of a truly rewarding musical life.

The release this past spring of Pat's third solo album of electronic music marked something of a turning point in his career. *Rainbow Delta* (PVC 7914) is Pat's first album of original material, coming as a natural progression from his two previous LPs of imitative synthesis (electronic renditions of music written for traditional instruments). The music on *Rainbow Delta* falls into no particular category. It effortlessly incorporates pop accessibility into a complex and immensely satisfying fabric of classically influenced melodic invention and skillfully realized electronic textures. Pat Gleeson's music reflects, in its sonic variety and stylistic synthesis, the wide spectrum of his background and influences: from the minimalist trance music of Terry Riley and Philip Glass that gives the music its pulse, to the improvisational techniques of numerous jazz pianists and the pioneering electronics of Wendy Carlos.

Pat is very concerned with the quality of his composing, and feels that musicians working with electronics too often fall prey to the alluring pitfalls of flashy effects. "With a 24-track recorder and enough time," he says, "you can walk into the studio half-prepared and orchestrate your way out of most of your problems—I've seen too many people do that." Pat finds an essential hollowness to music that relies too much on aural gimmickry, and to keep himself honest uses the restrictions imposed by a live performance. "If you are forced to do what you can only do live, and not depend on esoteric timbres and lots of studio tricks like flanging, phasing, echo and so forth to give you the kind of ambience you want, you have to be sure it's deeply embedded in the music." As Pat told an interviewer in *Synapse* magazine, "There's something not right about music which is only performed in the studio. It's

very difficult to stay musical. Probably because music is a performance art, and I think that the most beautiful statements you make in music are for an imaginary audience, and that imaginary audience just gradually dims and then goes away in the studio." He emphasizes the risk imposed on the performer in live music. "You have to be willing to go down in flames," he says.

What drove Pat Gleeson to the thorny embrace of the synthesizer? Nobility of purpose, perhaps? "Not quite," he laughs. "I saw the synthesizer as a kind of shortcut that would enable me to express myself musically much faster. In fact it just added one whole layer of complexity to the process of making music. By the time I discovered that, though, it was too late to turn back." Indeed. What was it like for him in the beginning? "I just holed up in my house for six or eight months—drank a lot of beer, smoked a lot of grass and played piano and organ for 12 hours a day. I came out of that with passable rock and roll keyboard chops—enough to do some sessions." In the course of one of those sessions Pat found himself in the same studio as Paul Kantner of the (then) Jefferson Airplane

**"When a
synthesizer
is used to create a
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instrument."**

(later Starship) who was recording his *Blows Against The Empire* rock/SF epic.

"Paul seemed to like what I was doing, so he just left me in the studio with the tapes of the album, and told me to overdub whatever I wanted. I did—and after running out of songs to add to, I recorded some of my own stuff on the same tape, most of which ended up on the next LP, *Sunfighter*." From there Pat went on to play with jazz pianist Herbie Hancock, contributing synthesizer to the seminal *Crossings* album (one of the first jazz records to include synth, and a pivotal album in the jazz-fusion genre). Pat stayed with the Hancock band for two years of touring and recording, while simultaneously playing on other sessions and building his own studio—Different Fur (now a booming operation run by Pat's wife and employing a staff of ten).

"All this time, though," Pat says, "I was trending toward composing." Playing on sessions, arranging and producing a total of 15 records for other artists became a grind that was almost as unfulfilling to Pat as his years

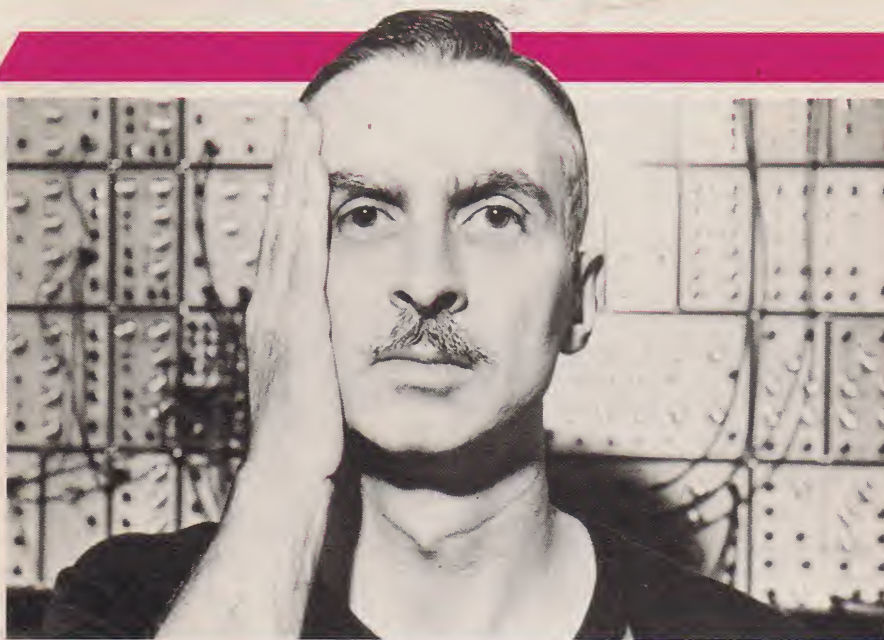
teaching. "Most people hire producers so they can ignore them." Pat resolved his dilemma by recording a demo tape of the opening to Gustav Holst's orchestral suite *The Planets*, and sending it out to record companies. This led to a deal with Mercury Records, for whom Pat recorded *Beyond The Sun: An Electronic Portrait Of Holst's The Planets* (Mercury SR180000) and *Patrick Gleeson's Star Wars* (Mercury SRM 1-1178). Though Pat tends to dismiss those albums now, they were necessary for his development as a composer of electronic music. As he wrote in the September 1978 issue of *Contemporary Keyboard* magazine, "Imitative synthesis is the first step—one could even think of it as a litmus test—which determines whether one knows enough about the nature of good musical sounds to be able to invent new instruments. Because this is what we are doing when we take a synthesizer and use it to create a sound which other instruments do not make; we are inventing a new instrument."

Pat found himself devoting much of 1979 to the monumental *Apocalypse Now* project, on which he served as Master Synthesist. His job was to coordinate the synthetic sound realizations of the team assigned to work under him, as well as satisfy the fickle genius in charge—Francis Ford Coppola. "I was brought on to the film after the first group hired to score it was fired. Immediately, three out of the five people brought in with me were fired—it was that kind of crazy scene." Pat soon found his hands full with the task of soothing bruised egos and smoothing over personality conflicts aggravated by the intense pressures, to say nothing of his musical duties. "Francis said to me, 'You're the artist. All the music will flow through your hands—you'll shape it and direct it.' " That small assignment ended up consuming 575 hours of studio time and nearly destroyed his family life. "We're only just recovering—it was an incredible project, sort of like the Viet Nam war with its casualties, politics and technical mobilization." Was it worth it? Pat responds with a curious laugh/grunt. "If I hadn't done it once, I'd want to do it—but I don't think I would want to do it again."

As a direct result of his involvement with *Apocalypse Now*, Pat now finds himself on the verge of signing to do a pair of major film scores. The proposed films—one an animated fantasy feature, the other an adaptation of a bestselling horror novel—would both involve all-electronic scores. Pat sees filmscoring as a pleasant and challenging way of subsidizing his less lucrative pet projects—solo recording and taking an ensemble on the road. Rehearsals are now underway for a tour tentatively planned for the fall featuring Pat on his heavily modified, micro-processor-controlled synthesizer, accompanied by synthesist Lenny Pickett and David Blossom on guitar. "I'm thinking of adding a cellist—I love cellos. They can be both mellow and, when played up in the violin register, quite passionate and tense." There are also plans for a live album.

Beyond the touring and film projects, a

Patrick Gleeson



His synthesized sound tapestries are uncommonly accessible experiments.

By LOU STATHIS

multitude of possibilities are presenting themselves to Pat Gleeson. "I've just gotten the script from Pal Kantner for another *Blows Against The Empire* album. There are several other people involved besides myself, and I'm not sure what I will do, but Paul's asked me to do some writing and playing. He's talking about writing a novel around it as well." Pat also indicates that an album with Lenny White (drummer for the last incarnation of Chick Corea's *Return To Forever*) and Chris Franke (Tangerine Dream synthesist) is in the talking stage. "We all want to do it, but since we're all signed to different record labels the paperwork might become rather involved."


Moving from the personal future to speculation on the general future of music brings out a marked rise in Pat's Enthusiasm Quotient. "There's just so much interesting and exciting music being made today—in rock, there's people like Brian Eno, The Talking Heads and Tuxedomoon while in electronic music we have Michael Hoenig and, of course, Wendy Carlos. I like what Steve

Reich has been doing a great deal—his music has those qualities that I love in Ravel, the timbral and harmonic sheen, like something bright hanging in the sun, glinting as it slowly twists.

"Music today is moving outward in so many different directions. Anything that you can see as possible will be happening—synthesizers alone, synthesizers with conventional instruments . . . There's no doubt that the synthesizer has joined the array of instruments that we commonly use. It's well on its way to joining the orchestra, I think. Control has always been a problem, and recently we've seen some remarkable advances in the realm of synthesizer controllers—there's no reason that synthesizers have to be controlled with keyboards. I've just had a wind-interface built for me which I think has tremendous potential."

Though there is much enjoyment to be gotten from the exploration process that is modern music-making, Pat Gleeson's words stress the virtue and ultimate rewards of hard work. "I do a half-hour of scales every day.

The more independent your hands are, the more independent your mind becomes. I work and study *all* the time—I'm always reading and listening. Herbie Hancock was a demon for that. He told me once that I should spend six months doing nothing but studying Ravel's *Daphis Et Chloe*. Someone asked Stravinsky once, 'Under what circumstances do you feel most inspired?' and he had this wonderful answer, 'When I'm composing.' He didn't mean that as a paradox or a non-answer. If you're a disciplined musician when would you be most turned on to music? Simple—when you're actually sitting down and working with the materials."

Hard work, persistence through adversity, constant absorption of input, facing challenges head-on, taking risks, maintaining personal honesty and integrity, and exploring your inner self with any means at your disposal. These are the ideals and practices that have shaped Patrick Gleeson the human being and the musician. With *Rainbow Delta* as only the beginning, one can't help but eagerly await what lies ahead. 



NIGHT/LIGHT &

2 Technology-Inspired Works of Art

By BARBARA KRASNOFF

When I was a little kid, I grew up right next door to a fireworks factory in New Hampshire. My brother and I used to shoot the fireworks for the Fourth of July. Most fireworks you see are kind of like the Macy's approach—you just blast as much light as you can get into the night sky. World War III stuff. But it doesn't have to be that way." To prove it, James Pelletier has developed a new and electrifying form of art: light sculpture.

The young artist may be best known for his work entitled *Night/Light*, in which he transformed the normally abstract brilliance of the New York City skyline into a series of geometric shapes by orchestrating which windows should be lit and which should be left dark. The first showing of *Night/Light* was on October 20th, 1979, as part of a celebra-

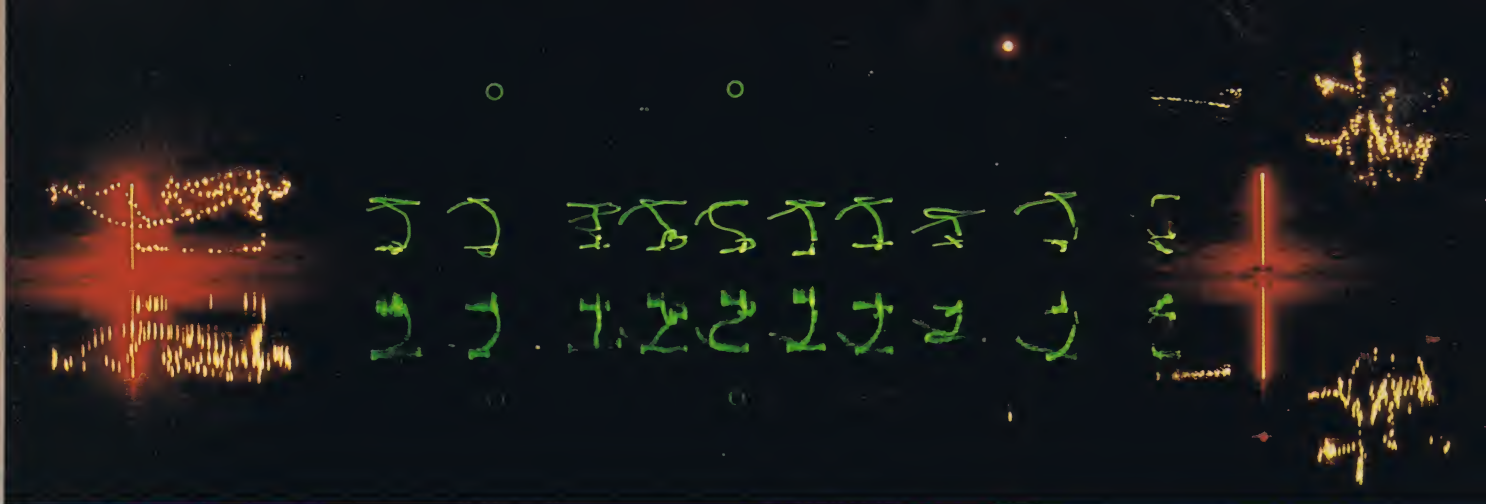
tion of the 100th anniversary of Edison's invention of the light bulb. "It took nine months to set up and it lasted three hours," explains Pelletier. "The initial problem was to determine where there would be light and where there wouldn't be light on a permanent basis. Some of the floors are always lit; some of the places always have light; other places never have light. So that was very time consuming.

"I had to sit down with the electrical engineer and we had to go over floor by floor, window by window: Is there light here? Is there no light here? In one building I had to go through every single floor and window and test the shades to make sure they'd work." Some unexpected problems Jim encountered included plants, books and cabinets on window sills, burnt out light bulbs, vacant offices, floors without any shades or blinds, and other obstructions.

Considering that the project involved some 12 buildings (an estimated 3700 windows), this could prove rather frustrating. "The solution," Jim reports, "was pure and simple patience." With the cooperation and help of the buildings' management and maintenance crews, the light show appeared on schedule. Some 5,000 people assembled on the Brooklyn Heights promenade, across the river from Manhattan, to view the unusual spectacle.

On October 11th, Pelletier plans to repeat his performance with a few additions. "What I have on the boards now," he says, "is to use the same buildings, but design different light patterns for each of the buildings so it will be a completely new light series. And at either end I'll have a searchlight, so you'll have these

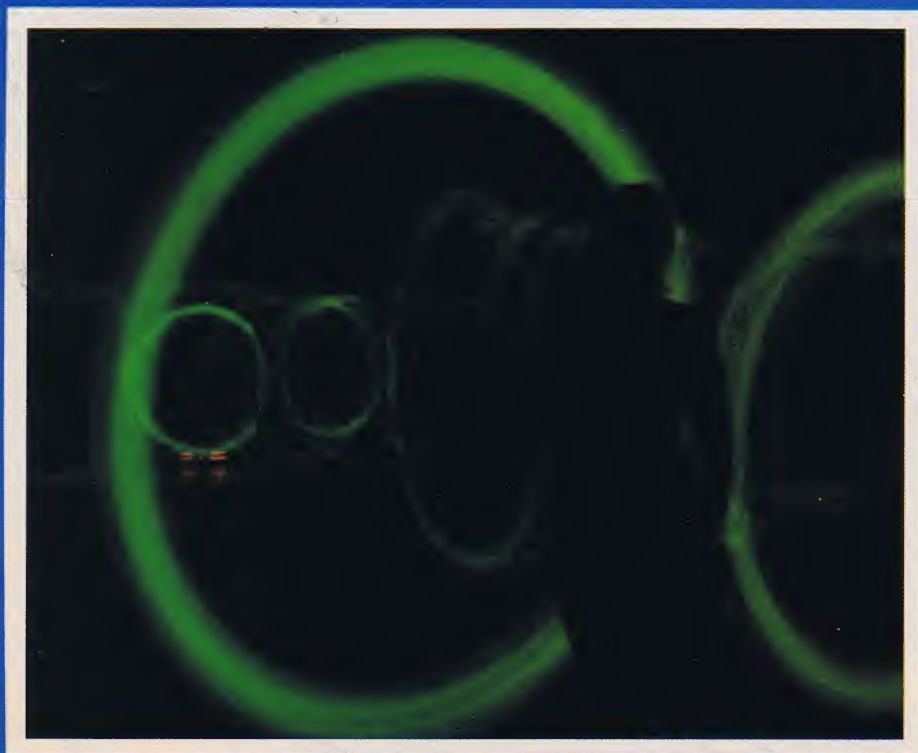
Above: The skyline of Manhattan takes on a geometric symmetry in Pelletier's 1979 showing of *Night/Light*. Facing page: In *Moondance*, a modern dance production by Pelletier and June Anderson, dancers use both modern technology and a nearby lake to create a moving fantasy of color and light.



PHOTOS © 1980 PETER BLANDORI



MOONDANCE



long columns of light going up.

"What I want, either from the ends of the piers or from three or four barges, is to do a fireworks exhibition. There are some really incredible fireworks now. You can just fill this whole area with stardust falling, things like that. You can really control it now to where you can get beautiful big ellipses and different diameters, and you can get them to shoot at different angles and heights."

While organizing the lights of New York may seem like enough to take up anyone's time, Pelletier is using his light sculpture in another major area as well. In collaboration with dancer/choreographer June Anderson, he is working on an innovative dance program called Moondance, in which human movement is combined with various forms of mobile and stationary light.

In fact, Pelletier first began to consider light as a separate art form while working as a set designer for a dance company. "The problem among dancers and touring companies," he explains, "is that they have to be very mobile and nomadic. When you go into

(continued on page 67)



1980 MEETS 1941

A New Film Tackles the Time Travel Paradox

By ED NAHA

In United Artists' \$14 million opus, *The Final Countdown*, a nuclear powered aircraft carrier sails headfirst into a mysterious electrical storm and finds itself transported through time; plunked into the Pacific Ocean past, hours before the Japanese airforce is destined to attack Pearl Harbor. The sailors aboard ship face a particularly sticky dilemma. With its awesome nuclear might, the warship offers them the chance to stop the Japanese invasion, prevent the December 7, 1941 tragedy and thereby rewrite the last four decades of world history. Should they intervene? Could they intervene?

"It's quite a problematic situation," understates the film's producer Peter Douglas, "almost as difficult as making the movie itself."

For newcomer producer Douglas, getting his aircraft carrier onto the silver screen was a more difficult task than sending it back through time. "The whole film took about three years to launch," he says. "It took quite some time to pull together because of its more unusual aspects. Time travel. Fantasy. Warfare. Plus, you have to remember that the star of the film is the U.S.S. *Nimitz*, a real-life 95,000-ton nuclear powered aircraft carrier." Douglas pauses for a moment. "It wasn't easy."

The ambitious storyline to *The Final Countdown* first materialized (mysteriously, of course) in Douglas' mailbox, the work of Thomas Hunter and Peter Powell. "It was basically a Bermuda triangle story," Douglas recalls. "An aircraft carrier is transported through time because of the triangle, winding up in the Mediterranean off the coast of Yugoslavia just about the time that Archduke Francis Ferdinand was to be assassinated and begin what would become World War I. The general idea really excited me. I went to a friend of mine, David Ambrose, who's an excellent writer. He came up with two words that set the tone of the finished picture: 'Pearl Harbor.' Pearl Harbor is a point in time everyone can relate to. We abandoned the Bermuda triangle angle and the ship's sudden re-emergence in the Mediterranean Sea... which was pretty tough to explain. We now utilize a freak storm. We don't explain how the storm affects time. One might assume from the way it acts that it has something to do with magnetism. We sort of used some of the theories concerning black holes as a basis to spin off from in terms of a time portal effect. You really have to use your imagination, though."



Producer Peter and star Kirk Douglas onboard the *Nimitz*. Opposite page, the *Nimitz* emerges from a time warp and actors Ross and Durning find themselves in hot water.

Imagination seemed to be the key word during the film's embryonic days. Imagination as in: "You gotta be kidding me! You know how much that'll cost?" In an effort to boost the film's commercial potential, Peter approached his father, actor Kirk Douglas, with the script. The elder Douglas was interested but wary. He told Peter he'd need an aircraft carrier, planes and \$10 to \$15 million to pull off such a project.

Peter was undaunted. "If I get them will you do the picture?"

Much to the elder Douglas' surprise, a few months later producer Douglas had gotten permission from the U.S. Navy to use the U.S.S. *Nimitz* as the star of the movie. Douglas agreed to star, along with Martin Sheen, Katherine Ross and Charles Durning.

At this point, producer Peter Douglas had to carefully evaluate the acting capabilities of the *Nimitz*. At his disposal aboard the craft were 10 squadrons of eight different type aircraft: the F-14A Tomcat, jet fighter-interceptor which flies twice the speed of sound; the A-7E Corsair II, jet light attack bomber; the A-6E Intruder, low-level attack bomber; the EA-6B Prowler, tactical electronic turbo-jet radar and radio jammer; the S-3A Viking, jet-powered anti-submarine search plane; E-2B Hawkeye, early warning radar defense craft; the SH-3H Sea King gas turbine-powered helicopter used for anti-submarine and cargo transfer and the RF-8G Crusader, supersonic photo reconnaissance plane.

"The ship is phenomenal," says Douglas.

"We took a look at it and came to the conclusion that, with this vessel at our disposal, we wouldn't attempt any intricate special effects involving the use of miniatures. Who needed them with all this real life wizardry? We decided to play off the ship's magnificence. Grumman, the makers of the F-14, helped us develop special camera mounts for the wings, tails and cockpits of the planes. On the screen they function as an audience ride-along. Using the real ship, the real planes and the real crew, we've made an impressive fantasy adventure that has a real taste of reality."

"We've created a sort of docu-drama fiction. Reality and fantasy mesh. We use real missiles, for instance, to shoot down drone planes in the movie. We've gotten some remarkable shots. It's not miniature model work. It's solid. It's big. It's there."

This heightened sense of reality did pose some unique problems for the producer, however. "The coordination of the movie and Navy crews was the most difficult aspect of the production," Douglas confesses. "We had a huge movie crew, about 125 people. We had emigrated onto a ship that holds 6,500 people. We had to face the complexities of staging dog fights with people who knew what they were doing in terms of flying. Those experts had to deal with people who knew what they were doing in terms of filming but not in terms of flying a plane. Bringing it all together was crazy. We were filming on the ship. We were filming in the air. We

(continued on page 67)

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"INVADERS FROM MARS"

Color—Starring: Arthur Franz, Helena Carter, Jimmy Hunt, Morris Ankrum. Young boy is unable to convince townspeople he has seen flying saucer land in backyard. One by one, his parents and others are "taken over" by invading aliens. Classic cult movie directed by William Cameron Menzies.



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"FLIGHT TO MARS"

Color—Starring: Cameron Mitchell, Marguerite Chapman, Arthur Franz. An expedition crashlands on the red planet and discovers an advanced underground civilization. Beautiful special effects, matte work! Produced by Walter Mirisch.



"THE FLYING SAUCER"

B/W—Starring: Mikel Conrad, Pat Garrison, Hanz Von Teuffen, Virginia Hewett. A huge saucer, hidden under a glacier, is the subject of search by U.S. and Russian scientists. This was the first film dealing with flying saucers and was reviewed by FBI before they allowed its release.



"SPACE PATROL" Vol. 1 (3 episodes)

B/W—Starring Ed Kemmer as Buzz Corry & Lynn Osborn as Cadet Happy, with guest stars. Set in the distant future, this sensational adventure series was one of the longest running and most popular of early TV, with the Space Patrol braving weekly dangers ("live" from Los Angeles) to keep interplanetary peace. Included: Early 15-minute episode, prior to Buzz Corry's emergence, plus two 30-minute episodes with commercials, "Mystery of Planet X" and "The Trap on Planet X."



"TOM CORBETT—SPACE CADET" Vol. 1 (3 episodes)

B/W—Starring Frankie Thomas as Tom, this series became giantically popular in early 50s, playing on four major TV networks, with a radio version, a comic strip and numerous merchandising tie-ins. Based on Robert Heinlein's book *Space Cadet*, the series had rocket expert Willy Ley as tech advisor. Includes: "Ace of the Space Lanes" & "The Martian Revolt," plus premiere 15-minute episode, "At Space Academy." (Commercials & Trailers)



"THE CRAWLING EYE"

B/W—Starring: Forrest Tucker, Janet Monroe, Jennifer Jayne. A chilling SF terror tale of a shlimmering alpine fog that contains deadly creatures from another planet. Victims are found decapitated; tremendous tension! Released in England as "The Trolenberg Terror," with music by Stanley Black.



"HIDEOUS SUN DEMON"

B/W—Starring: Robert Clarke and Nan Petersen. A scientist at an atomic lab is accidentally exposed to radiation which turns him into a grotesque killer reptile when sunlight hits him. A real gem of "camp" horror!



"STRANGER FROM VENUS"

B/W—Starring: Patricia Neal, Helmet Dantine, Derek Bond. A benevolent (but frightening) being from space lands to warn Earth and pave the way for arrival of "mother ship." Never released theatrically in U.S., this is essentially "The Day the Earth Stood Still" redressed. Historically Fascinating!

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How do you envisage first contact with an alien race?

TED WHITE

*Hugo award-winning author Ted White is also known for his editing skills. The former editor of **Amazing Stories** and **Fantastic Stories**, he is currently at the helm of **Heavy Metal**. Among his best known works: **By Furies Possessed** and **Secret of the Marauder Satellite**.*

Variouly.

The nature of any contact we may have with aliens will depend upon two factors: the nature of the aliens, and humanity's own position.

Let's take the last-named first. At present humanity is split into a dozen major nations, hundreds of smaller nations, a score of religions, and countless ethnic sub-groupings. If alien contact occurred today,

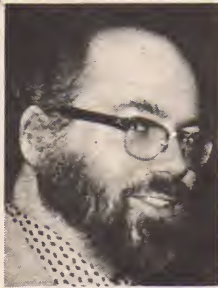


PHOTO: JEFF SCHALLES

a great deal would depend upon *who* among us made that contact.

We tend to think of "us"—humanity—being united in some fashion in the future. We speak of "Earth" as though by some point in the

future we will speak with one voice, have one representative or set of representatives acting for us. I consider this a fairly unlikely event. If history teaches us anything, it is that people can find nearly anything to disagree over—and probably will. With the worldwide population still on the increase, future populations will undoubtedly (barring disasters, natural or man-made) be larger, and diversity of opinion yet greater.

If aliens initiate contact, they might—in their ignorance—step directly into the middle of a dispute. If they make contact they will have to choose with whom they make that contact. There are thousands of possible scenarios. (Each of them might make an interesting story. I don't propose to give any of them away here...)

But let's say they don't initiate the contact, at least not directly. Let's say that either we discover them in our space explorations, or we initiate contact in some other way. That narrows it down just a little.

People are trying to contact sentient aliens right now. Our space probes (Voyager, et al.) are designed with the thought of alien contact in mind: They carry those famous plaques showing sanitized representatives of a human (caucasian) male and female, a simple diagram of our solar system, and some elementary math (math being the closest to a "universal language"). The odds are not impossible

(merely quite improbable) that aliens may someday encounter one such probe.

Likewise, we've been trying to contact aliens by interstellar radio for some years, now—both via broadcasts and (more importantly) monitoring signals received with radio telescopes.

The most likely form of alien contact is likely to be via messages—on radio frequencies or visible (light) frequencies. The universe is unbelievably vast—even our own galaxy is larger than we can easily comprehend—and the odds that we'll physically bump into an alien race in our own little corner or space (especially with our primitive space-traveling vehicles) are much lower than that we'll receive (or intercept) signals from vastly further away.

If we *do* receive signals, communication is still going to be difficult. The first and most obvious problem is that of *time*. No signals of which we're aware (and thus likely to receive) travel faster than light itself, and light travels interstellar distances with measurable slowness. Signals coming any real distance (say, from elsewhere in our own galaxy, but not our own arm of the galaxy) will take many years to reach us. Even centuries. A two-way conversation under such circumstances would be impossible—at least for us in our time-frame.

Assuming that we did receive and exchange signals, other problems would crop up. As mentioned earlier, math is the best "language," at least to start with and to establish basics. But will the aliens receive our communications in the context we sent them? We know nothing about them—their metabolic rate, their life-span, even the spectra they perceive as "light" and "sound." These aren't unsolvable problems, of course. But we shall have to build enough common reference points between us to make real communication viable.

And this brings us to the core of our problem: the nature of the aliens. Much will depend upon this.

Will they be quasi-humanoid? Will they have evolved in an environment similar enough to ours that they will have *anything* in common with us?

The more the aliens resemble us, the more potentially dangerous they would be. We would be in direct competition for similar environments. Wars of conquest would be possible.

We must bear in mind that just as we humans hardly all speak with one voice, so also the aliens may be divided by attitude and opinion. They may be equally diverse and equally duplicitous. (Indeed, we might meet a superior version of ourselves—especially if it is they who come

here to our solar system—and we may find ourselves in the position of the American Indians greeting the early European explorers and colonist...)

We should also keep in mind how difficult we find it to communicate among and between our own races, nationalities and linguistic groups. These difficulties can only be compounded by contact with genuine aliens.

Thus, both factors in the equation, the nature of humanity, and the nature of any aliens we may eventually contact, are variables.

Solving the equation before either factor is established is an exercise in hypotheses: amusing, but little more. Reality, when it comes, will undoubtedly surprise us. All I hope is that it's a pleasant surprise.

MACK REYNOLDS

*Veteran writer Mack Reynolds has been publishing science fiction since 1946. Among his best-known works are **Planetary Agent X**, **Satellite City**, **Commune 2000 A.D.**, **The Towers of Utopia** and **Police Patrol: 2000 A.D.***

The question was not a difficult one some 30 years ago when the present writer was first doing science fiction stories.

The intrepid space cadet jumped into his faster-than-light space ship, his zapper pistol holstered at his side, and took off for Luna, Mars, Jupiter, Saturn, or possibly Mercury. He arrived to find the air and gravity exactly the same as on Earth and hence had no difficulties on that score when



he confronted the extraterrestrial life forms. There were usually two types of aliens. The first race was "humanoid" and humanoid with a vengeance, particularly the ladies. They were beautiful in the Hollywood or

Miss America tradition, were scantily dressed in clothes surprisingly similar to harem garb at the time of Harun-al-Rashid, and spoke excellent English. The second set of alien life forms were another thing. They were known in the idiom as BEMs, that is, Bug-Eyed Monsters. And, frankly, they were dillies. For some reason or other, they preferred the humanoid beauties to their own females and pursued them unmercifully.

These are now the early years of the space age. The youngest of science fiction

readers have *seen* what the surfaces of the Moon and of Mars look like. There have even been brief glimpses of Venus, photos taken by soft-landing Soviet probes before they burnt to a crisp. It has also been discovered that there is precious little air to be found on any of our sister planets.

So then, if it has become unlikely that our astronauts and cosmonauts will run into the standard alien races of the science fiction yarns of yesteryear, just what *will* they encounter? Obviously, no one knows.

On the face of it, alien races will be *really* different from life forms on our own world. More different, most likely, than a man is from an insect such as, say, the ant, or cockroach. After all, they share this world with us and are remarkably similar in many respects. They breathe air and most of them, at least, eat foods that our own bodies can assimilate. They transport themselves on legs. They have such organs as eyes, mouths and ears. Oh, yes indeed, insects are very similar to us. They are even based on the same protoplasm bricks that make up our own foundations.

But isn't it possible, the galaxy being so very great, with its literally billions of stars and planets, that life forms similar to our own might have evolved?

In answer, let me quote from a story of mine, "Enemy Within," which originally appeared in *Analog* magazine. The idea is based on material sent me by the late Nobel Prize laureate Hermann J. Muller, possibly the greatest geneticist our nation has produced, and an inveterate reader of science fiction.

"Fond romantics to the contrary, it is most unlikely that elsewhere in the galaxy the evolution of life will duplicate that on Earth, finally to the point of producing vertebrates. Vertebrates are unique, indeed.

"Take for example, the manner in which we breathe air. It comes in through the mouth or nose, and inconveniently must share the same canal for food. The snail, whose lung has a passage and opening distinct from the food passage, is better off. So also is the grasshopper which breathes through portholes near the organs to be aerated. But this is not the sole off-beat quality of the mouth. Besides serving for both air and food, it is also the most powerful weapon of us vertebrates and sometimes the most deft organ of manipulation. In addition, the mouth has the peculiar function of emitting sounds and is also used for expressing feelings through sneers, smiles, scowls and such. Yes, the mouth alone is most unique. An organ combining ingesting, breathing, chewing, tasting, biting, fighting, yelling, whistling, grimacing,

murmuring love preliminaries and helping to thread a needle.

"To expect an alien life form to evolve along such similar lines as to produce such an organ, is truly asking too much. Gentle reader, in your fond dreams of far planets, hope not ever to kiss an alien mouth."

So, in answer to the question, "How do you envisage first contact with an alien race?" I answer, "I don't, but I am sure that they are going to be *awfully* different than us."

JOHN SHIRLEY

SF author John Shirley's newest novel is City Come A-Walkin'.

Assuming it hasn't happened already, and assuming that by "alien" we mean interstellar aliens and not interdimensional, we may suppose that they've learned quite a bit about us already from the radio and television transmissions we are constantly leaking into space. This very possibly accounts for their reticence in establishing further contact with us.

Actually, the real difficulty is in the intervening distances. But whether we establish contact by some sort of long-distance transmission—via manipulation of tachyons, faster-than-light-particles?—or through direct physical confrontation



PHOTO: MARK GLAZER

(in which case they have access to knowledge of physical laws outside our present scope, knowledge making it possible to travel interstellar with practicality—the faster-than-light barrier is very daunting) we'll probably find common ground of communication through the use of comparative universal mathematical symbols, certain exercises in logic which are so basic, and which emerge from the constant laws of physics in effect in all parts of the galaxy.

So—what *is* alien? How alien will they be? Although we feel very much racially apart from other species on our own world, polar bears and elephants and bees, still we have something very basic in common with them. DNA! Every form of cellular life uses the DNA molecule to organize itself; the DNA contains the blueprint of the whole animal. The molecular DNA spiral for an elephant is differently arranged from that of a human being—but is made up of the same components, ultimately . . . two different pictures utilizing the same pigmentation. So, we have this basic affinity with the other creatures of *our* world. Somehow, we

can relate to them on the cellular level—through a similar cellular under-organization—and in that we are all carbon-based, all of us metabolically burning oxygen.

But suppose our hypothetical aliens are organized according to a very different molecular make-up—perhaps they're not masses of cells at all, as all Earth organisms are; perhaps they're *not* directed by the "mainspring" of DNA. They might have a basic physical organization so very . . . well, so very *alien* to us, so outside our realm of biological experience, that we will have no cellular affinity, and we might find close proximity intolerable! It could be the organic equivalent of the meeting of matter and anti-matter.

There are other dangers. It is a mistake to presume that simply because they'd have the superior technology making it possible for them to travel between solar systems, that they're also socially or philosophically superior. Questions of "superiority" and "inferiority" in such matters are of course relative and slippery. But, supposing that there is a plane of social evolution in which sentient beings live in harmony, we can only *hope* that our visitors have evolved to this level. Because, if they haven't (and God knows we haven't), we may be in trouble. They might well consider us vermin, or expendable. Our own civilization has made amazing technological and medical strides in the past decade—and yet we're so unevolved that we're still funneling vast sums of money into devising new types of nerve gas and biological warfare. We can't assume technological advancement means benevolence.

But we can't assume that they're hostile, either.

So perhaps the conclusion must be: Start with the basics and make no assumptions. Pre-suppose nothing about them.

One last possibility. If the aliens are sufficiently like us so that we could trust them with some of our own, and if we can find parents and children courageous enough, able to recognize the vast importance of communication between two disparate worlds—and willing to take risks because of this importance—then perhaps we could arrange a foreign exchange program *for children*. We could take their young (careful to learn all their biological needs, and to provide for them) and they could take samples of ours for, say, a year at a time. The result? Hopefully, cross-cultural osmosis. The children would have to be old enough to be away from their parents without panicking, but young enough to have the advantage of the child's openness which makes the whole project attractive. A child would have fewer preconceptions, fewer prejudices, greater empathy and most importantly, the necessary intuition that

might be the one thing capable of bridging the cultural gulf between worlds.

RICHARD A. LUPOFF

*SF author and critic, Lupoff is best known for **One Million Centuries**, **Space War Blues**, **The Triune Man** and **Sandworld**.*

First of all, and at the recognized risk of sounding like the late Dr. Sloane of *Amazing Stories*, I have to say that I am not at all convinced that there are any aliens to contact. I've seen the articles, listened to the arguments, and bowed to the statistical inevitability of there being aliens. But...

But no one has ever produced a single shred of evidence to show that aliens actually exist. So for all the statistics and arguments, those wonderful purple-skinned octopoids that we all know and love so dearly are entirely hypothetical. And in fact, as we learn more about the universe, even the hypothetical aliens get more and more remote. We used to think they might live on the Moon. Then we learned better, and moved the creatures to Mars (ah, those dead sea bottoms, so like a colder Arabia!) or Venus (ah, those steaming swamps and jungles, so like a cross between the interior of Brazil and the Okefenokee!) Then we learned that Mars and Venus are no good, and moved our octopoids to the planets of another star...

But let's assume that those purple octopoids exist. Will we ever have any contact or communication with them? Best take note that the scale of the universe isolates us from those aliens in both space and time. Science fiction writers and others have pretty well taken account of the distances involved, but relatively little attention has been paid to the problem of time. Schklovsky has pointed out that an intelligent race, especially a technologically oriented race, has a limited time on the stage of life.

Consider that the life-span of our universe, from primal atom/big bang to total entropy/heat death or ultimate collapse, is on the order of 20 to 40 billion years. And figure that the life-span of a technically advanced culture is a thousand years or so. Even if the odds that two technologically oriented, space-probing societies should appear within communicating distance of each other (itself an imponderable proposition), should work out favorably... the odds of their appearing at the same time are incredibly remote.

So what we're likely to see is Race A visiting the home planet of Race B, and finding no life at all because it has not yet appeared. Or life, but no intelligence, because it has not yet appeared. And maybe never will.

But if life, intelligence, and technology do appear on the home planet of Race B... members of Race B may yet visit the home planet of Race A. And find only a sterile ball, where life has so long disappeared that no signs of it remain.

Still, as long as we're speculating, hypothesizing, let's assume that two intelligent races do meet. The first, and toughest, question, is whether they can recognize each other and establish any communication at all. We think, nowadays, that the dolphins and maybe the whale, might be intelligent, self-aware creatures. "People."

But we aren't sure of that, and our level of communication with them has so far been depressingly limited, and little progress is apparently being made. Yet, evolutionarily speaking, these cetaceans are our first cousins! What if the ants and spiders and bees are intelligent and self-aware creatures? "People!" They are our second cousins, and we haven't even got started in communicating with them!

So when we meet a real alien—a denizen of Fornax 1097 XII—we may think he/she/it is a rock and he/she/it may think we are a piece of carboniferous flotsam. Whew!

But I don't want to sound too discouraging. I think there's a chance we can reach them in this big time/space maze. I'd like to see us try, and try by every means available. That means spaceships with crews aboard 'em, it means crewless probes, and it means Ozma-type electronic probes, both active ("Hello, hello, this is *homo sap* calling—is anybody listening?") and passive ("we're listening/we're listening/we're listening").

And if we do come across anything that we think might be "people," the most likely way to make 'em recognize us as more of the same, I think, is to show 'em technology. Show 'em spaceships, radios, tractors, whatever. When you see technology, it's hard not to suspect intelligence and self-awareness. It isn't impossible, of course. Beavers build dams and birds build nests, and both are technology of a sort. And the dolphins are so beautifully adapted to their environment that they have apparently never seen any reason to build anything.

But if a purple octopoid slithers up to you and shows you a piece of machinery that he's built himself, you will have a very strong suspicion that he's intelligent. From there we go to the proverbial log tables, periodic charts of the elements, maps of the solar system, and so on, that science fiction writers have doted on for decades.

Nobody can know that there are aliens out there, but there surely might be, and

finding them and talking to them is one of the most exciting challenges in the whole plurality of worlds.

Oh, about Dr. Sloane. He was the editor of *Amazing Stories* from its first issue under Hugo Gernsback, in 1926, right up through 1938. He was a wonderful, sprightly old gentleman with a twinkle in his eye, and he maintained to the day of his death at the ripe age of 89 that space travel was impossible. A nice enough conceit around which to write fantasies, but utterly impossible.

OCTAVIA E. BUTLER

*Author of **Patternmaster**, **Mind of My Mind**, **Survivor** and **Kindred**.*

First, how have we met the aliens?

Have they come to us? If so, even if their attitude toward us is completely non-hostile, contact with them, certain knowledge of their existence, would turn the various human cultures upside down. Some humans would worship them. Many would feel threatened by them. Even before communications problems began to be solved, military, economic, and governmental inter-

ests would attempt to court them, use them, hoard them to the limits of the aliens' tolerance. No science or philosophy, no racial, religious, national, or international interest would be unaffected. And how would the

aliens react to us? Perhaps they would be too busy examining us and theorizing about us to be interested in exploiting their powerful effect on us. Perhaps in spite of their ignorance and ours, they would manage not to harm us—and perhaps we would manage not to harm them. Since they have come to us, however, now or in the future, they must be at least as technologically advanced as we are. And since they would almost certainly have come from another solar system, chances are they would be more advanced. Also, chances are they would have more control over our effect on them than we would over their effect on us.

But what would happen if we went to them, discovered them on their world at some time in the distant future? First, we would have to recognize them as intelligent beings—not necessarily a simple matter. If they were lucky, we would not only recognize their intelligence, but find them to be at least as intelligent as ourselves. If they were even luckier, we would find them to be as technologically advanced as ourselves. If they seem less advanced, only their vast distance from Earth or the utter unsuitabil-

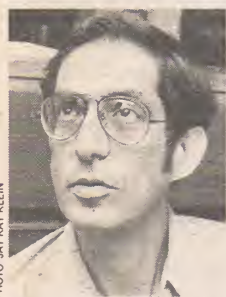


PHOTO JAY KAY KLEIN



PHOTO RICHARD TODD

ity of themselves and their world to our needs and desires would be likely to save them from exploitation. Our record in dealing with each other does not bode well for any nonhuman species we might discover, no matter how peaceful we believe our intentions to be. No doubt humans of conscience or scientific curiosity would strive to keep more exploitive humans from overwhelming the new species militarily or culturally. Such humans have often spoken out in intercultural conflicts here on Earth, but they have rarely been able to stand in the way of governmental and economic leaders who are likely to see them as impractical and naive.

And how would such leaders see the nonhumans? How would humans in general see the nonhumans? If we saw them as ridiculous or ugly or in any way repulsive, they would fare less well at our hands. We have always attributed greater value to that which we considered beautiful. It might also be better for the new species if it were not humanoid. The more human it appeared to be, the more we would expect it to think and behave as we do—and the more offended we would be by its deviations from the human norm. Chimpanzees and gorillas, for instance, are considered ugly because they look so much like us, and yet are so different. A few chimpanzees and gorillas have been taught Ameslan—American Sign Language—and can communicate with signing humans. These are not merely trained animals. They communicate in a human language and understand concepts thought to be totally human. They have learned to swear, inventing their own swear words. They have invented names for unfamiliar objects. They have learned to tell lies. A young signing gorilla given human intelligence tests has been shown to have an I.Q. of 84 to 95—only slightly below average for a human at his stage of development.

Yet aside from the usual animal lovers, how many humans would object if it were decided that some of these apes should “be sacrificed” for scientific reasons or simply caged in zoos. They are only apes, after all, and we have a long history of caging them. The fact that they have turned out to be more intelligent than we believed is not likely to modify our behavior toward them soon. And if it did, what directions would the modifications be likely to take? Directions beneficial to the apes, or directions intended to make the apes useful to humans? We’ve been thinking for some time about ways to use another group of animals who may be brighter than we think—the dolphins. Since apes resemble us (or vice versa) more than dolphins do, it would no doubt be easier for us to make use of them.

In a sense, then, we have already had contact with intelligent, nonhuman species.

Most of us simply haven’t realized it yet. I fear for the other species when we do.

It isn’t that we are a malevolent species. I don’t believe we are. However, we are more shortsighted in our treatment of our fellow creatures—including our fellow humans—than is healthy for beings heading into space, possibly to meet intelligent extraterrestrials. And we are vastly more self-centered than is necessary for our survival and our progress. In our individual dealings with each other, we may show generosity, fairness, and wisdom just as we may show greed, brutality, and stupidity. But sometimes confrontation with the different—with humans who look, sound, or believe differently, with animals who are not quite what we thought they were, and most likely in the future, with any vulnerable aliens we discover—brings out the worst in us. We are our own standards of perfection, and we prove it regularly.

GEORGE ZEBROWSKI

*An alumni of the Clarion SF Writers’ Workshop, Zebrowski is the author of **The Omega Point, Ashes and Stars, The Star Web** and **The Monadic Universe**.*

Contact with an alien society may be envisaged only on the basis of what we think we know to be possible about the nature of alien intelligence; but since this “alien nature” is not much of an object for experimental study, most of us who think about the subject wind up holding just about every position there is, at one time or another. And rightly so; in an area of general ignorance, it may be useful to hold

competing and complementary views. In the case of alien intelligence, *all* views may be true in different parts of the universe. This does not mean that we must entertain the idea of a visit from



PHOTO: JAY KAY KLEIN

“roast beefs on roller skates” from the galactic core, where radiation has produced a “well done” form of life; stranger things may in fact confront us one day.

I think that we may well run into aliens who are like us (if we can credit the notion that G-type stars can produce humanoid evolutions as trees produce apples); G-type stars are supposed to be the grass of the universe. We may encounter aliens who seem to be like us on the surface, but who are alien in non-obvious ways. “Vastly different” aliens may come in unguessable varieties. Stanislaw Lem’s *Solaris* depicts one kind of distant “other.” The intelligent ocean of this novel may be viewed as a

special case; other aliens may be more knowable. Although I’m drawn to a pluralistic approach to the subject, it may be that we will in fact never be able to know alien intelligences.

It’s very hard, if not impossible, to avoid envisaging aliens as bits and pieces of ourselves—our moods, hopes, fears—made into imaginative “wholes”; the non-human life of our planet has been a rich source of models for alien intelligences, from E.E. “Doc” Smith’s charmingly innocent creations to Gregory Benford’s sophisticated interstellar visitors. It may be that what we draw out of ourselves may in fact reflect a few of the possibilities to be found in the universe.

What is interesting is that, in addition to our familiar creations, we do understand the possibility of a “vastly different” class of aliens, even though we cannot fill this class with specific creations. This is a far cry from “here there be dragons”; it points to the kind of epistemological maturity which may one day free us from our planetary provincialism.

A confrontation where Earth is visited by powerful and “vastly different” aliens would be like starting a fission reaction without control rods. *Ideas* would be deadlier than weapons, spreading with varied impact into all the layers of human consciousness. We differ in world-views according to our ethnicities and cultures—all the world-views which have ever existed, from simple to complex, still exist today. The result of an alien visitation would produce a runaway reaction, forever altering human history. Imagine, if you can, the same thing happening to an alien society. What complexities would be involved there?

Since I believe that we live in an open-ended universe (one in which physical law is complementary to free will, novelty, unpredictability), where events are explainable after-the-fact, but not always predictable, then spontaneous imagination may in fact be our best guide to what is possible; it may hit upon truths not easily deduced. Reason and experience clean up such intuitions and sometimes confirm them; neither is much good without the other. Thus are we joined to nature. It would be hard to imagine that aliens are different in this regard. So maybe the lamp of imagination can reach out to them, and we simply don’t know it yet.

Ask yourself: How do we know other people, if not through imaginings based on our own internal life, imaginings which are then confirmed or denied by acquaintance? Human beings who live around aliens, will get to know them, insofar as experience of anything (scientific experiment is itself a form of refined experience) enables us to get to know anything. We won’t until we try it. © 1980 George Zebrowski

Cosmos

(continued from page 19)

and bought the stuff. The scene was filmed over a period of two days. The second day, the pig's head went a bit off. So the wine turned out to be absolutely necessary to keep spirits up."

Associate producer/director David Oyster, also sequestered in one of KCET's sound editing cubicles, marvels that the series was ever attempted at all. "One of the great things about *Cosmos* is that you got to try things that you wouldn't ordinarily get to do. I think it's all been very carefully done, yet we rarely went the safe route. We always reached out for something different.

"For instance, I did a sequence in Italy on the theory of relativity. That's a very complicated idea. For Einstein, however, it was all very simple and intuitive. He started thinking about what it would be like to ride on a beam of light. He was able to come up with some really astounding conclusions. To illustrate the theory, we used a boy in Italy on a motor scooter and gave the scooter the magical capability to travel at near the speed of light. When that happens there are certain physical phenomena which are assumed to occur. The light would be red-shifted behind you and blue-shifted in front of you. The world would be kind of wrapped around you in this tunnel effect.

"We had a special lens devised to get that tunnel effect and then some optical work with the film gave us the red and blue shifts.

"We filmed the sequence in Leonardo da Vinci's home village. We went there because da Vinci was an advanced thinker of his time. He fantasized about flying machines but the technology was not available to him. Einstein fantasized being able to ride on a beam of light and the technology, too, was not available."

"I don't think I've ever worked on a production in which every technique and style of television making was used," adds producer/director David Kennard. "Despite the technology involved, in the end, the approach of the show was determined by the man, by Carl Sagan. There's just no way to make a good series by denying the personality of the man on camera. When Carl is at his best, he encourages people to feel wonderment about things. He also sometimes insists on sitting people down and saying 'Now please learn about the following, partly because you're not going to be amazed unless you *know* the following. . . ' When he's on he's able to hit a response in people, to make them say 'wow!' Now, if you can combine hard science with his approach and still get that 'wow' effect, then you're going to be doing something that none of these long television series has ever done before."

Reviewing last minute changes in the series, Sagan pauses to reflect on his ambitions for the show. "I'm hopeful that the general audience will have more sympathy to the idea of supporting science because of *Cosmos*. Planetary exploration, certainly, but also

astronomy in general, science in general, observatories in Earth orbit, ways to understand the origins of life, radio telescopes to search for extraterrestrial intelligence.

"I hope it encourages a future in which people have a sense of what science is about, a feeling that it's not too difficult or beyond them, a persuasion that they can affect their own destiny by influencing decisions which are based on science and technology.

"Also, I see it as a way for people to have an awful lot of fun by realizing how exciting it is to understand the cosmos."

Sagan flashes a boyish smile. Down the hall in the screening room, Carl Sagan's spaceship reaches the end of its maiden voyage. The first finished episode of *Cosmos* ends. The gaggle of reporters leave the room, very much impressed. The video screen returns to a state of dormancy. But only for a moment, as work continues at KCET.

Cosmos' Clout

Although reaching the air at the end of September, actual work on *Cosmos* will not be completed until mid-October when the last episodes will be assembled in full. Shooting on the show ended last February but the meticulous post-production work drags on. Perhaps 'drags' is too strong a word. 'Glides' would be more appropriate in that everyone concerned with the spacey show selflessly pours their all into its final form. Twelve-hour days. Seven-day weeks. There's a lot at stake with *Cosmos*, both in terms of dollars invested and impact desired.

Adrian Malone, seated in his office across from the old Monogram lot, reflects on the futuristic show launched from the old fashioned-looking studio complex. "I think *Cosmos* proves that America can do these 'created documentaries' originally done by the BBC. My greatest pleasure in doing *Cosmos* has been in training the team to film it. Now that we've got this first class team capable of doing documentaries in a manner not attempted in this country before, it will all just take off.

"I never do any program at all unless it has to do with the history of ideas. And I think that's what these sorts of series are about. I would call it edu-tainment.

"If *Cosmos* gets a high rating, the show will prove that PBS, given the right people and the right amount of money, can take on the networks on good ground. It will be very important, politically, to public broadcasting. I think that it may move the networks to recognize something which seems to have been staring them in the face for years: that the audience out there does have an intelligence quotient above 70 and it really is time that the continuous insult to their intelligence is stopped."

Sagan sees a similar beneficial effect of the show's possible success, but from a different viewpoint. "The scientific conceit that the public is too dumb to understand science, that it's a waste of time to popularize science has got to go. That sort of thinking hasn't slowed me down. In fact, it's speeded me up. There are still some scientists who think like

that, but that's not at all the predominant view in the scientific community today. Scientists are well aware that science today is supported by public funds. And if the public doesn't understand what it's buying, it's going to be reluctant to spend more money. I think it's essential for civilization that we continue to do science and to have the sense that it's a worthwhile activity. There's no way to get that done unless we explain what we're doing."

"Because of *Cosmos*," Malone injects, "people will recognize that ideas are actually attractive and they don't need to be always clothed with an air of somber worthiness. You don't need to put on a white coat and hold a test tube to be called a scientist. And you don't need to be on at 6:30 Sunday morning to talk about the philosophy of aliveness if you spend enough money and have enough imagination about it."

Project director Andorfer is a bit more philosophical about it all. "I think that people will come away with a sort of reverence and awe for the cosmos. One of the ideas interwoven throughout the whole series is the idea of star-stuff. . . . that we are both literally and figuratively connected with the cosmos. The elements in our world and our bodies were literally cooked in a star billions of years ago. We are a star's way of knowing about a star. That idea sort of haunts me. It's frightening in a way, but also elegant and beautiful. Most people just don't think about things that way. If the audience gets that, and gets it clearly, they can't help but be changed."

Even as Andorfer speaks the shape of *Cosmos* continues to evolve, continues to move towards completion. In the offices, in the corridors, in the editing room work goes on. Sound mixing. Color correcting. Overdubs. Perfection is sought. Perfection will be found. The planets, the theories, the very fabric of time and space will be ready to enter the homes of viewers across the globe by September 28. And what of the months after September? What of the audiences left in the wake of the series?

Carl Sagan ponders the future from his TV studio office. The total impact of the show is hard to gauge," he readily admits. "The fact that it will be seen by at least 150 million people throughout the world is significant. That's three percent of the people on this planet. I think that, out of those 150 million people, there will be ten million kids who will be excited by it. And of them, there will be a million who hadn't intended careers in science but decided to give it a try because of the show. And of those million, maybe ten thousand will actually attempt it. And of those ten thousand, maybe there will be a few thousand good scientists spread throughout the world. And of them, maybe there will be four who are absolutely first rate who would not have gone into science without *Cosmos*."

Sagan leans back in his chair and smiles. His eyes sparkle with a visionary gleam incapable of being matched by mere special effects. "And four absolutely first rate scientists is a *big* contribution."

ADOLF SCHALLER



ART © 1980 ADOLF SCHALLER

By ROBIN SNELSON

Adolf Schaller holds the distinction of being one of the few modern space artists who has never painted two spaceships locked in a laser battle. His visions of the universe have more to do with speculations on other life forms and the human destiny in the cosmos. "I've painted laser beams, but never in destructive terms. I leave that to supernovas and chance. If we die utterly as a planet, then it should be by something like that—not by our own hands or switches. Suicide is stupid and boring."

Although his Santa Monica apartment is only five blocks from a beautiful beach, Adolf's skin looks untouched by the sun's rays. He's been on the west coast for a year and a half, but retains his Chicago pallor. "I haven't been down to the beach in a month or so," he says nonchalantly. "I work 20-hour days. But I don't think of it as work. I feel fatigue like I've been doing work, but it's a lot of fun. It's play. I have absolutely no complaints."

He will readily admit that he's not a particularly earthbound guy. His mind runs easily into the future and out amongst the

stars. "I don't spend much time around here," he says, indicating the planet under his feet.

A couple of years ago, Adolf began to occupy himself with thoughts of creatures who might live in a gas giant planet like Jupiter. He made dozens of sketches, designing species and working out ecological niches for each. Then in early 1979 he was contacted by Jon Lomberg, who was organizing a crew of artists to work on Carl Sagan's *Cosmos*. Lomberg encouraged Adolf to migrate to Hollywood to work on the space effects for the series. Offhandedly, Lomberg suggested that Adolf give some thought to life forms that might exist on Jupiter.

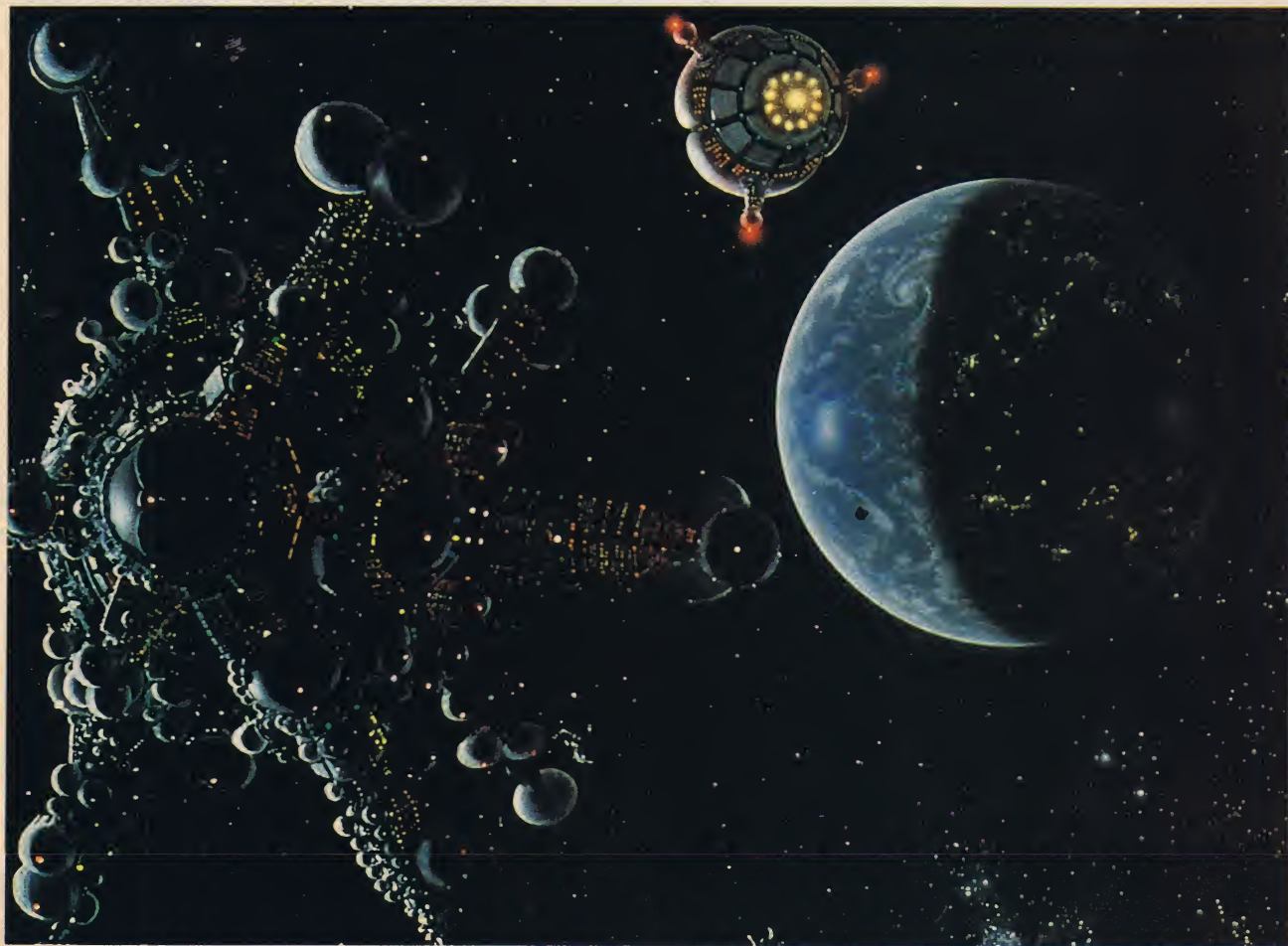
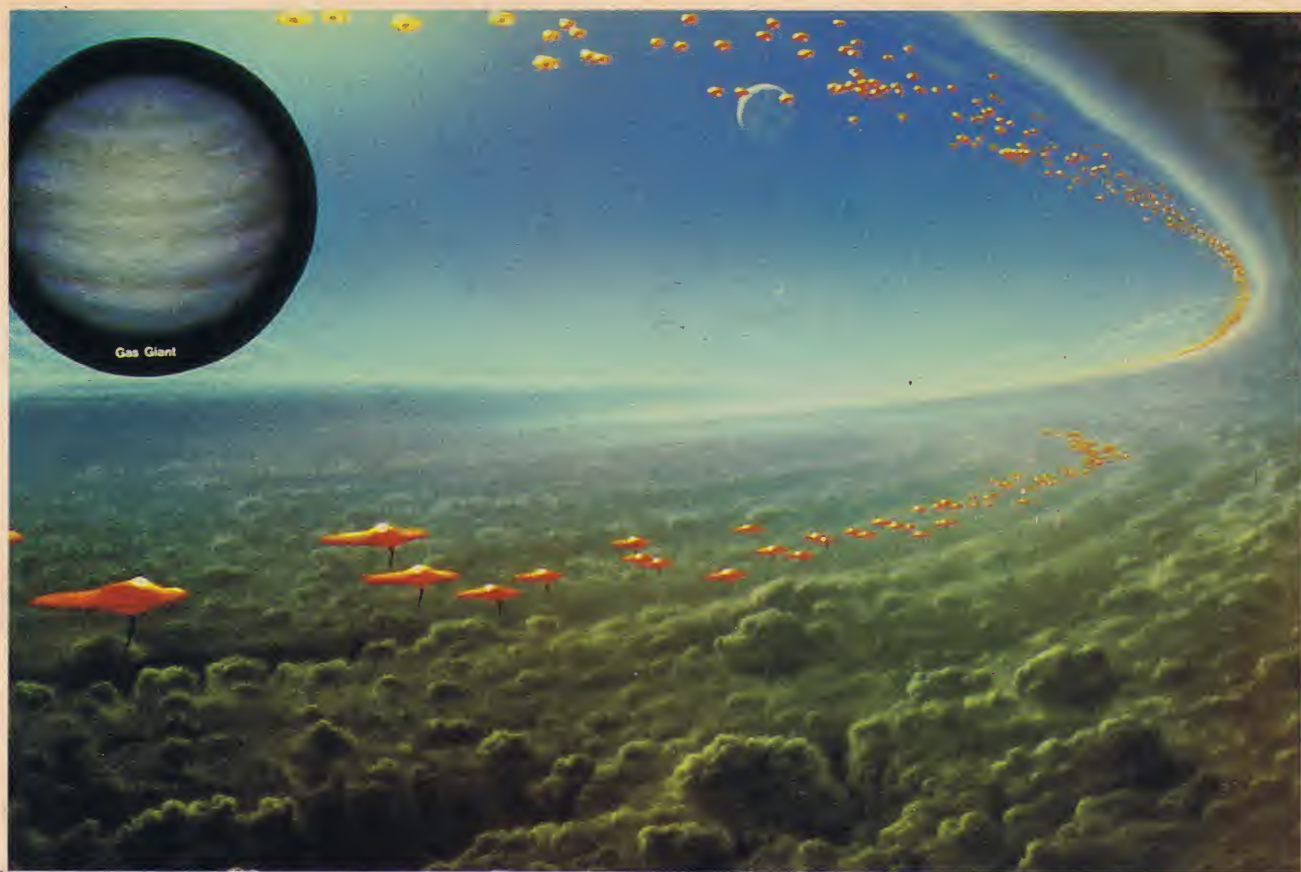
"I told him I just happened to be working on that," Adolf's Jovian musings evolved into a massive, nine-panel painting which the *Cosmos* camera pans across while Sagan speculates about the life forms.

"After I'd been doing these designs, Sagan co-authored a paper describing gas giant planet life forms, which they called 'hunters, floaters and sinkers.' They were

Above: The outer atmosphere of a giant X-ray star is drawn into a black hole.

Top, right: Speculations on life forms that might evolve on a gas giant planet, from a still available Edmund Scientific slide set entitled *Life Beyond Earth*.

Bottom, right: A recently completed space city which appears in a special effects sequence of a commercial produced for Security Pacific Bank.





ART: © 1980 ADOLF SCHALLER

If Mars were terraformed to achieve an Earth-like climate, this is how it would look from moon Phobos.



ART: ADOLF SCHALLER © 1978 EDMUND SCIENTIFIC

From Edmund Scientific slide set Other Worlds: Early plantlife transforms Earth's atmosphere.



"Hunters, Floater and Sinkers," a nine-panel extrapolation on gas giant life forms painted for *Cosmos*.



Early in the life of the sun—the P-Tauri phase—the solar wind sweeps the solar system clean.



A powerful quasar emits a beacon of energy somewhere across the universe.

the same basic species I'd been coming up with."

Not bad for a kid who didn't actually finish high school. Now age 24, Adolf has already conquered the frontiers of astronomical art, with memorable works seeing publication in all the major magazines. Terrance Dickinson, currently the editor of *Star and Sky* and the man who first published Schaller, remarks, "Adolf is a true genius. He is to his day what Chesley Bonestell was to his."

When he was growing up in Niles, Illinois, the son of eastern European immigrants thought he wanted a career in science. But he found something he liked better. "It was so much more fun to talk about what was already known," he explains. "To actually get an image down that scientists look at and say, hey, yeah, that's exactly what we've been talking about! Scientists have their own

mathematical language. They can converse with each other and understand each other just fine. But nobody else can understand them. So I can provide the language that is universal."

Adolf's entry into the world of space art was somewhat unconventional. "I was a freshman in high school and there was a new magazine coming out called *Astronomy*. I decided to put a few of my paintings in a giant plastic garbage bag and drive up to Milwaukee," Terrance Dickinson, the founding editor of *Astronomy*, saw the contents of Adolf's garbage bag and a long and productive relationship was begun.

Adolf found the artwork taking precedence in his life.

"In my sophomore year I had a discussion with my art teacher," Adolf recalls. "I said, look, I'm very busy and I can't mess around with school anymore. It's holding

me back." The teacher struck an unusual bargain; Adolf began bringing in monthly copies of *Astronomy* to fulfill school requirements. He never attended another class.

"I don't know how many other artists go through the same thing, but school at a certain point begins to impede you. It's just not inspiring."

Leaving school, however, did not mean the end of his education. If anything, it accelerated. "If you read any books at all, you're way ahead of any course that's being taught," he observes. His impressive grasp of subjects like astronomy, biology, evolution and physics is entirely self-taught. "I read as many scientific papers as I can get my hands on. I use the libraries at universities and I listen to a lecture now and again. But I won't pay for it and I don't care about grades. They're just pictures, symbols that don't mean anything to me."

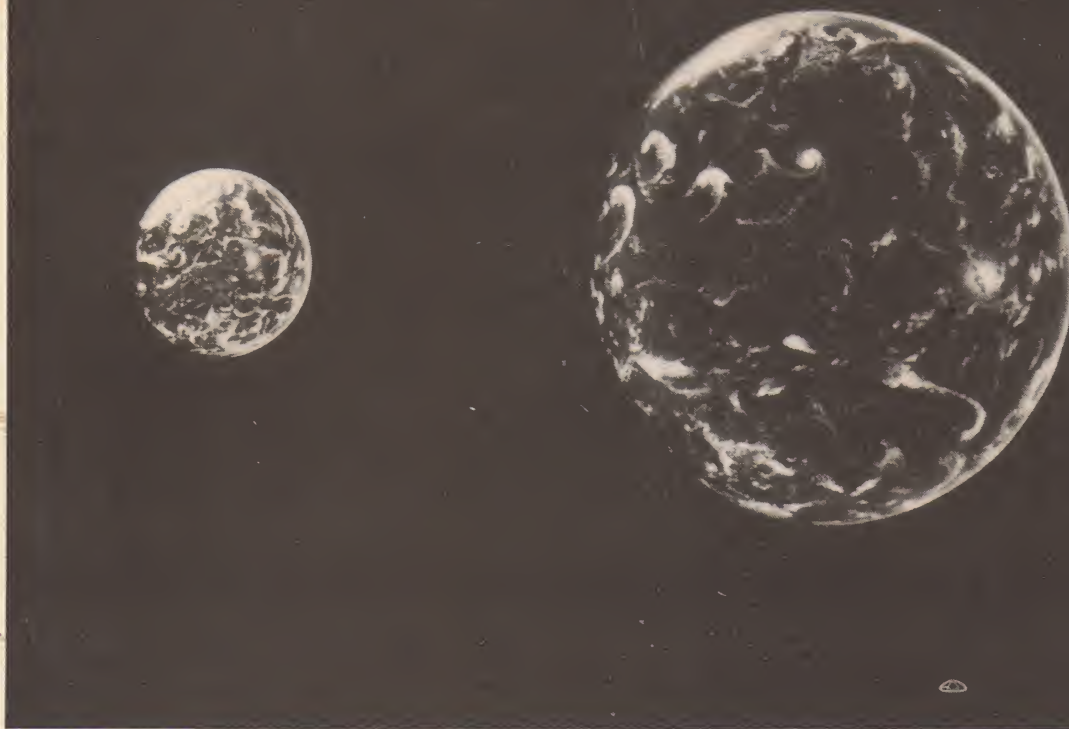
With something more than grades in mind, his appetite for information is high. For the moment, his favorite scientific frontier is in the area of particle physics.

"I think recent developments in high energy particle physics will open up a way of life that our ability to manipulate the electromagnetic force only hinted at. I think the next thing is the modification of gravity. Experiments in particle physics give many clues as to what the nature of the four fundamental forces are and how you can unify them all. Einstein was very interested in unifying all the forces into one grand scheme. I think once that's figured out, you'll have the answers to such things as the Big Bang, what quasars and pulsars are... the whole gamut all the way down to quarks.

"I think there's no question that we're on the way—" he points to the sky, lifting his eyebrows in a characteristically understated show of enthusiasm, "—much sooner than people think.

"I like the concept of evolution. Biological evolution leads up to something that has a consciousness. We start thinking and then we begin to have tools and technology. Then there's a technological evolution and the tools begin to be combined in strange ways... and in the future we'll be leaving the planet. We won't be just planetary surface organisms. We'll be stellar organisms and then galactic organisms... I don't think it's too far-fetched to think that in the future the universe might hatch and we might emerge in a 'birth'."

As individual as his personal cosmology is his style of painting—also self taught. The secret, he reveals, is the fine line he's able to produce using his trusty AB airbrush. He begins by airbrushing the canvas black. Next he draws in white with the airbrush, achieving the basic design of the painting and making sure that the black and white stage has the complete scale of contrasts he's after. Next he applies transparent inks to add the colors. After touching up the white highlights and



The Moon is terraformed to become a mini-Earth; painted for a book in progress with James Oberg, *New Earths*.

darkening down the remaining black areas, he polishes off the canvas with a protective gel.

"It took a lot of trial and error, but it's my technique." He laughs. "Well, now it's not *all* mine. It became the standard way to work for the effects on *Cosmos*. When I came there, everybody was painting with brushes. Once they saw my AB airbrush, everybody promptly bought an AB. It gives you more control and it's fast. You can transfer the image you have in your head to film more immediately."

Adolf's experience on *Cosmos* was hectic and taxing. And he loved it, because it bought him the kind of education that only arises in desperate circumstances. After several months of painting and model-building, it was time for the artwork to be transformed into film.

"There were all sorts of problems at the first special effects house," Adolf recalls with a sigh. "They were in the midst of building their motion control tracking system while we were generating artwork. We were all rushing to try to meet deadlines and everything was sort of disorganized for a while there."

Meanwhile the effects languished. "About three weeks before deadline, Adrian Malone, the executive producer came up to John Allison (supervising artist) and me and said, 'We've got to have something out of this place. Give me one shot. Shoot *something*.' That was in September. For three weeks we just worked night and day."

It was a big job: the task was to get on film a trip from the edge of the known universe back to the surface of Earth.

"Most of the artwork was done two or three months before, but it wasn't being shot on a regular basis," Adolf shrugs. "We finally had to do it. We got out of there with 40 or 50 shots."

And so Adolf and John Allison came to the rescue where high-priced Hollywood effects houses faltered. "When John and I came here, we knew next to nothing. We learned. It was the best college possible. . . cram course." He smiles. "Now we know everything."

Firmly ensconced in Los Angeles for the present ("It's more inspiring than Chicago"), Adolf plans to keep his hand in the film business. He has one idea for a feature film in outline stage already. "It may or may not be fiction, depending on how I work it out," he says enigmatically. "To me, science fiction is speculative writing and what I do is speculative illustration. We're all trying to recreate reality so we can understand it."

He won't be frustrated by the non-artistic aspects of film production, either. "I ignore the business, that's how I get through it. If you let it get to you personally, then you don't finish what you start. You have to deal with studios, but that's no problem. You just deal with them. You get it done. And if somebody does a bad job, then you do it yourself. Since I can do special effects from the very first stages all the way to the very last stages, and everything in between, I do all right."

After finishing up work on *Cosmos*, Adolf worked with John Allison on special effects for a television commercial. He's also got three books in the planning stage, one on the solar system as seen anew by the

most recent planetary probes, which he's working on with a planetary geologist from the Jet Propulsion Laboratory.

Another creative avenue is his music. "I compose music and I've been learning a lot about electronics, how to orchestrate my compositions through electronics." He compares his music to the songs of whales. "It doesn't *sound* like whale music. But if you were to ask a whale why he sings, he'd say, well, I just sing because I've got this theme. It always evolves, it's always growing, but it's always the same song. It was the same song 20,000 years ago, but it might sound different today because of an evolutionary trend. It's a universal song and they're trying to get it right. That's what I'm doing."

In the future, he envisions a synthesis of his art and music. "My grand dream is to combine as many senses in a recording, a work of art, as possible. To stimulate the whole brain."

While he paints, he listens to different kinds of music. "I listen to classical stations, I like electronic music, I'm a Chicago blues freak. . . When I listen I'm always thinking about techniques I could use for my own stuff. The artist, in order to create properly, also has to be a real good audience. If he doesn't understand his audience, then he's not going to be able to communicate. No way."

Adolf Schaller knows his audience very well. "They're not dumb. They're not going to be fooled. And they enjoy seeing the good side of the universe, splendidly presented. . . so that things like death don't seem that bad anymore, because it's all part of the cosmic scheme."

Acid Precipitation: A Hard Rain's Gonna Fall

Even the sound of it is enough to conjure up a deadly scenario—acid rain. It falls innocently from the sky and looks and smells no more harmful than the stuff we're used to coming in from, that the umbrella protects us from, that brings May flowers. But in this case, we don't want it to come back another day. Its full development, movement through the atmosphere, journey back to Earth and total impact once it falls is not completely understood. But enough is known to assure scientists, environmentalists and governments that something has to be done about it. Acid rain kills.

Basically, acid rain begins with the release into the atmosphere of sulfur dioxide (SO_2) and nitrous oxide (NO_2), produced by oil- and coal-fired power plants and motor-vehicle emissions. This compound combines with oxygen to form dehydrated sulfuric and nitric acids—not what you'd consider soothing, cleansing or nourishing. Most is known about acid precipitation's effects on lakes and streams; less is understood about what it can do to the soil, vegetation, buildings and, of course, humans.

What acid rain does is simply alter the pH level of water. (Acidity is measured by this pH standard, which ranges from 0—highly acidic—to 14—highly alkaline. Distilled water registers as pH 7. Acidity develops logarithmically. From pH 7 to pH 6 represents a 10 times increase in acidity; a drop to pH 5 means a 100 times increase from neutral pH 7.) A typical lake has a reading above pH 8. Depending on the existing chemical makeup of a particular lake, the process may take varying amounts of time, but the end result is always the same. As the pH level of the water drops, so too does its life. Amphibian species begin to disappear first, followed by a demise in plant life and other organic forms. Soon the fish and their eggs cannot survive. Oddly enough, when the process is complete, what's left is a deceptively clear, clean-looking body of water—devoid of any life.

The deleterious effects of acid precipitation were first realized in Norwegian and Swedish lakes in the 1950s. Concern spread to the States in the '60s, intensified and is now considered by some scientists as the most impending environmental concern of the '80s. The hazards of acid rain are most apparent in the northeast U.S. and eastern Canada, though today the enigma is cropping up in such pristine locales as Colorado, California and southwest Canada.

The flight of the sulfuric and nitric acids from their source is a curious one. Normally, if they fell within the general area where they are produced, little would happen. It was in trying to alleviate another problem—air pollution—that the stage was set for acid rain's ironic dilemma. Local communities' air was



Singin' in the Acid Rain? From California to Sweden, they're playing a cautious tune.

being contaminated by noxious fumes from power plants. The Clean Air Act and other laws directed manufacturers to take such measures as building towering smoke stacks (some reach higher than 500 feet), thereby directing the fumes away from the source. The reasoning proved shortsighted, to say the least. Prevailing westerly winds picked up the unwanted air. In the Scandinavian example, the acids traveled from industrialized England, Germany and other European urban centers. In the United States, the airborne SO_2 and NO_2 originates in the power plants and steel mills of the midwest—Ohio, West Virginia, Michigan. Some of the acidic material descends as actual particles through a process known as dry deposition. But most of the pollutants are washed through the air in the form of rain, snow, hail, etc.

The noxious material in the U.S. has made its way to the wilderness of New York's Adirondack Mountains, the first case of acid rain reported in the States. In 1975, a Cornell University report found that of 214 lakes above 2,000 feet surveyed, 52 percent had a pH level too acidic for fish survival. Last year, 170 lakes were said to be without fish life. The process has spread south to the Carolinas, west to the Boundary Waters Canoe Area of northern Minnesota, where 85 of 1,500 lakes studied were at an acid-critical state. Incidences of acid precipitation have most recently been cited in California and Colorado.

The greatest alarm is in acid rain's pernicious consequences for lakes and streams. The truth is that its harm spreads to every niche of an ecosystem. Consider a typical lake: Acid rain builds up over a couple of

years; run-off from spring melting of acid snow adds more. Eventually, the pH level of the lake is lowered. At pH 7, salamander eggs fail to hatch, the result of a calcium loss due to the increased acidity. At 6.6, snails die; at pH 6, latent mercury in the water is activated. When the pH measure slumps to 4.5, all fish life is gone; a few surface insects may still be skittering about. The water looks incredibly—though literally unbelievably—clean. There is stillness in death.

Acid rain's effect on vegetation is a two-headed monster. The acid washes away the leaves' waxy coating, exposing them to disease and insects; interfering with photosynthesis and seed germination. The deadly rain seeps down to the soil and plant roots; nutrients are broken down chemically and replaced by harmful metals. More death.

There is no conclusive evidence on how humans might feel the sting of acid rain, though mercury poisoning from eating contaminated fish is a real jeopardy; pregnant and lactating woman in some areas have been warned. For now, the human loss is confined to esthetics and economics—dead lakes are missed, and are expensive to restore. At the same time, though, the burden of the acid rain debacle must fall in the human lap. Granted, there is still much to be learned. In the meantime, researchers are looking for ways to deal with the present dangers. For instance, New York State's Department of Environmental Conservation has begun spreading lime (highly alkaline) into acidic lakes in an attempt to neutralize them—a costly and slow process. Other scientists are studying the ways in which the rain actually turns to acid, and how they might overcome or avoid the process.

One big break came from the White House last year. In his annual report on the environment, President Carter categorized the acid rain problem as one of the major environmental threats, and directed \$10 million per year into the Environmental Protection Agency-run Federal Acid Rain Assessment Program. Late last June, the EPA proved that there may be some bite to the acid-rain bark: they ordered two controversial power plants in Ohio to lower their production of sulfur dioxide.

To be sure, the battle over acid rain is far from over. Industry has from the beginning of the controversy denied its complicity and pointed to other contributing factors. The fight will go on for years. But the simple fact remains: Something is happening to the lakes and crops and soil and possibly to humans too. We can't wait for another Love Canal; we must act before we start evacuating families and mourning dead babies. Distant thunder from an approaching storm has been heard. The warnings have been sounded and must not be ignored.

Williamson

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not. Writing *Brother to Demons, Brother to Gods*, for example, I began simply with the intention to explore the ultimate possibilities of genetic engineering as far as I could imagine them. I worked out a history of creation that seemed logical to me, developed a series of creations, put them into conflict, and let their conflicts develop the story.

Your story, "With Folded Hands," has been labeled a science fiction masterpiece. What was the idea behind the story? Are you satisfied with it? How well does it hold up?

The theme is one I discovered in the story—not one I consciously set out to express; it is, in fact, a theme that I consciously am inclined to reject. As stated in my working notes for the story, "The perfect machine is diabolical, because it renders human existence futile." It is, I think, my most powerful, most effective, certainly my most successful story; in the ballots for the Hall of Fame volumes, it wasn't too far from the top. I think it holds up well. Like *Star Bright*, it has only a single fantastic element—the humanoids themselves—set against a completely ordinary background, with the major human characters a completely ordinary family. I recall one of the new critics faulting me for the ordinary setting, though I think it is half the secret of the story's effectiveness. It works amazingly well. In fact, two unrelated people at a recent convention told me that it had scared them so much they couldn't sleep. Again, I think the actual theme—a more basic and universal theme than one about man and machines—is the conflict between the individual and society. The machine, the humanoids, stand for society—the rational, public, ordered, necessary side of life. The hero—like the hero in the later novel, *The Humanoids*—stands for the individual, with personal needs in conflict with the claims of society. Again, I wasn't thinking all this when I wrote the story.

A persistent theme in your work is the view that intelligence could evolve in the most alien forms. Can you elaborate on this idea? How does it show itself in your writing?

I have often written about non-human intelligences. At one level, I suppose, this is a display of a sort of primitive animism or infantile animism—perhaps of interest to a lot of people because we've all lived through a time when we didn't know what was alive and what wasn't. At the level of science, I still think it's probable that intelligent life has evolved on many other planets and that its forms would appear strange to us. This sort of thing has clear and obvious dramatic uses. Science fiction stories are often stories of a protagonist in conflict with an alien setting. If the setting or elements of it are intelligent and purposeful, the conflict is obviously intensified. It is a thematic abstraction to say that the cosmos is hostile. It is dramatic to show the cosmos or part of it as alive and acting out of a purpose hostile to the hero—or, for that

matter, proven in the end to be friendly.

In one book, you describe science fiction as: "A kind of periscope, raised above our own time to survey possible worlds to come." How does a science-fiction writer accomplish this objective in the context of his work? How is he able to do this, where the mainstream writer often fails?

The image of science fiction as periscope reflects my old notion of "scientification as the searchlight of science." In our age, science is exploring the universe; I have called that the greatest and most absorbing mystery story. To the extent that science fiction relates to "hard" science, it can be seen as moving beside or sometimes ahead of science to probe the frontiers of knowledge. The scientist is—or at least is commonly seen as—intellectual, rational, seeking facts expressed as abstractions. The artist, too, is seeking order, but his order includes emotion. He wants to know how things look and feel and what they mean in every possible human dimension. His order is expressed in concrete images, not in abstractions; he is interested less in the facts themselves than in what they mean. The scientist uses the symbolism of mathematics, the artist that of poetry, and his symbolism can be relatively independent of literal truth. For example, I doubt the evidence for ESP, but I think telepathy—even though it may prove to be literally impossible—may often serve as an efficient and useful symbol for communication, even for electronic communication.

In several science fiction essays, you describe yourself as an "optimist," particularly as it relates to the tone you try to achieve in your work. In this regard, you state: "I think our pessimism has swung too far. Though the human situation does look alarming enough, I believe there is a purely accidental bias in favor of pessimistic fiction." What is the nature of that bias?

I do think the pessimist has an accidental advantage. Bad news is more exciting than good news. Goodness leads to peace, evil to conflict. In search of story drama, the writer looks for and exaggerates the sources of evil. In the real world, I think we're suffering a crisis of faith in ourselves, our technology, and our future. Witness the anti-nuke protesters. They are emotional fanatics, who know and care nothing for the actual facts or the actual consequences of what they want; in a sense, they are religious zealots. I can't really explain their irrational terrors, though I suspect there is some genetic basis; there may have been a survival value in running away from things one didn't understand. The anti-nuke people certainly don't understand nuclear energy. I can't help wondering if the pessimistic sort of science fiction may have been the cause of this paranoia, as well as its popularity a symptom of its prevalence. I do think it has begun to wane a little. I think that we'll get popular consent to build and run new and safer nuclear plants when the cars begin to rust on the streets and we begin to get a little hungry and shiver in the winter, but I hate to see them irrationally delayed.



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Finally, in looking back, how would you describe the grip that science fiction has had on you throughout your life? What accounts for its extraordinary personal appeal?

Science fiction has, in fact, been a major element of my life ever since I first discovered it. I have been writing it pretty steadily, though never very prolifically, for more than 50 years, with only two real breaks—three years of military service in World War II and a few years of graduate school in the early 1960s. As to its appeal, I have always wanted to understand our world. The efforts of science to explain and explore it, everywhere from the fringes and the beginnings of the universe to the most minute particles of matter and the origins of life, these have always fascinated me, and still do. I dreamed once of being a scientist. When I discovered science fiction, I had a feeling that it was revealing, or promised to reveal, the universe in a way that paralleled the explorations of science, expressing its findings less in terms of bare facts and mathematical abstractions, but more in terms of concrete sense impressions and emotions. Admitting that very few stories, of my own or anybody else, take us very far toward such a goal, I still feel much the same way. For me, science fiction has become a habit of thought and a way of expression. People used to ask if I wrote or wanted to write anything else, with the implication that science fiction could never say anything significant. But I suppose I could say it has become my voice, generally adequate for anything I really want to say.

Ellison

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his rampage of slaughter against the whores of London's Spitalfields, had fled the country on an immigrant packet and, working his way westward in America, had finally come to the Cherokee Strip where the same conditions of poverty and libertine living that had prevailed in Whitechapel manifested themselves. And his psychopathic nature reasserted itself, and he started killing the prostitutes who filled the nautch houses lining the Cimarron City staging area where thousands waited for the opening of the Strip so they could stake land claims.

So in an early sequence of the script, the Ripper is stalking a woman down the night-shrouded streets of Cimarron City; and I'd written it in ways that would heighten the terror by having it shot strictly in misdirection: in windows, in the eyes of a night owl on a building, in pools of water.

But the *auteur* gave all that a pass. He shot the usual cliché sequence with closeups on running feet, using an Arriflex, a hand-held camera.

But here's the part that convulsed me.

Picture it in your skull, if you will: the woman's feet running down the wooden sidewalks of Cimarron City. . . *fast!* A goddam blur of speeding tootsies. What I'm talkin' here is *mondo speedo*, gang! Cut to the feet of a man in tailored black pants, a Gladstone bag dangling from his hand so it's in the shot. Slow. Veeery slow. A stalking, measured pace; the stealthy walk of the mad killer. But slow. Veeery slow.

And it speeds up. The woman goes faster, faster, faster, running like a bat out of hell. But the Ripper keeps on stalking her slowly, slowly, veeeeeery slowly.

And he catches her.

Don't ask me how. If we could judge by the real world, anyone running as fast as that woman was running would have been not only out of the town, but out of that *time-zone* before a guy pacing along that slowly could catch her.

But he caught her. Don't ask me how.

So what is all of this about directors in aid of?

Well, directors are much on my mind these days. Prominently so, since I caught the press screening of *The Empire Strikes Back* in London on May 19th. I was on a breather in England and France—while the attorneys settled the lawsuit against ABC-TV and Paramount Pictures about which you've read in *Time* magazine—and finishing up a new novel; and Craig Miller, who was then with Lucasfilm, set it up for me to see the press screening at the Dominion Theatre in Tottenham Court Road.

(And just to set at ease all you incipient werewolves out there, poised to spring at my jugular, though I still maintain that *Star Wars* had all the smarts of a matzoh ball, I was more than pleasantly surprised at *Empire*. In fact, not to put too fine a permt on it, kids, I thought it was a helluva piece of filmmaking.

Enjoyed it enormously. Even said so to Mark Hamill who, if you recall an interview he gave last year, was not terribly happy about my *Star Wars* remarks. Nice chap, actually. We had a cheery conversation. The war may be over, friends.)

And I don't think that it was because I saw the film in London, a town I dearly love, that the film impressed me so much. I think it's a superlative job because of the director, Irvin Kershner. And I don't think Kersh did a creatively sensitive job of expanding the concept and the content just because he's the director Warner Bros. is trying to sign to direct my script of Asimov's *I, Robot*. Would I be that shallow, come on!

To tell the truth, I had nothing but feelings of utter trepidation when I first learned that Kershner wanted in on the *I, Robot* project.

Back in 1961 when I first paid attention to Kershner's work, on a film called *The Hoodlum Priest*, I thought he was a director to watch. Felt that even more strongly after seeing a film he directed in Canada with the late Robert Shaw called *The Luck of Ginger Coffey*, which was a superb piece of cinema. But as the years passed and Kersh added stinkers like *Up the Sandbox*, *S.P.Y.S.*, *The Return of a Man Called Horse* and the despicable *Eyes of Laura Mars* to his oeuvre, I came to think of him as a man who had done as much as he could, a man who would never hit the first rank of craftsmen.

Then one director after another balked at the enormity of the project that *I, Robot* presented. Ridley Scott came to see me and wanted me to do the rewrite on *Dune* and I said no thank you, but offered him a look at *I, Robot* and he took it away with him and decided no. I wanted Carroll Ballard—director of *The Black Stallion*, an astonishing piece of work—but he was off in Italy and Switzerland and, though we talked long distance about it, and he finally saw the script, he said no to it, also.

Then Eddie Lewis, the producer of the film, told me Irv Kershner had read my script and loved it and wanted to direct the film. And I panicked. Oh, God, no, I thought. Not the guy who directed *Eyes of Laura Mars*, one of the most evil films of all time. Oh, help!

But Kershner was the only director who wanted me back on the project. Warner Bros. was less than happy with me, for reasons that may well have been valid. Or might not. It's late in the day and I'm not up to going into all that.

So everybody said, "Kersh wants you back on this film. Go see what he did with *The Empire*. You'll be amazed, it's so good he's the hottest director in the business." And I swallowed hard because I'd *hated Star Wars* and I couldn't see *anyone*, not even one of the six I mentioned earlier, doing enough with that sophomoric story to convince me I should be happy about someone *potschky*-ing with my beloved script, which had taken a year of my life to write. But Eddie Lewis said stop being a *schmuck* and go see the film, and Craig set it up in London for me, and I came out of the theater with a wide

grin on my elfin countenance.

And when Kersh called and said let's get together and talk about *I, Robot* I was jubilant. And we did, and we did, and last week *Variety* and *The Hollywood Reporter* had a page one announcement that Warner Bros. had signed Irvin Kershner for the *I, Robot* project based on Harlan Ellison's screenplay and it looks like that might even be a reasonably accurate statement of how things are—even though we all know out here that the "trades" as we call them usually run hype and idle wish-fulfillment.

So I'm thinking about directors these days. I'm thinking about Ridley Scott, who has made two films that knocked me out; and I'm thinking about that lame who directed my Jack the Ripper script years ago; and I'm thinking about how the promise I saw in Kersh's first films has suddenly, after a bleak interregnum, burgeoned anew; and about how I may, after all these dreary years of waiting for my scripts to be done decently, have finally lucked out.

Because Irv Kershner talked to me not as if I was a beanfield peon, a scribbling toady with no stake in the creation of a beautiful thing that would enrich and uplift, a hack who would alter anything just to get the film made. He talked to me like a man who disavows the *auteur* theory.

Which is why I'm feeling pretty damned good today.

And just by way of closing, I'll let you have that list of the six directors in the world. I don't want any arguments about it. Don't bother writing me saying I left out this one or that one, or how could I include such-and-such whose films you don't understand. Just take the list and remember I'm never wrong, and shut up.

And they are: Kurosawa, Altman, Coppola, Resnais, Buñuel, Kubrick and Fellini.

What's that?

That's *seven*, not six?

Well, jeezus, nobody's perfect!

EDITOR'S NOTE: Mr. Ellison has been given a free hand to express his opinions. If you don't like what he says, it's not our fault. If you really love his column, we'll take full responsibility. Publishing is funny like that. The content is copyrighted © 1980 by The Killmanjaro Corporation.



1980 Meets 1941

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had to work within the Navy's schedule, too; keeping in mind that you couldn't plan just one scene at a time. The entire movie had to be of prime concern constantly. Every time you changed a shot or had bad weather hamper a shot, you changed the entire shooting schedule of the film."

Filming aboard the ship didn't allow for many of the zany antics usually associated with Hollywood productions, although it did produce a couple of uniquely oddball experiences. "The last day I was filming aboard the ship I actually thought I had been caught in a nuclear attack," Douglas laughs. "We were filming on the flight deck and we had the captain's permission to ignore the general quarters drill for that morning; a practice not usually done. We were filming inside some of the bigger planes; like the anti-submarine plane. We were shooting valves and gauges. When we got out of the plane we noticed that the entire flight deck was empty. That's strange, even during a drill. Then we started hearing these announcements over the PA. 'Underwater detonation... 5,000 yards. Stand by for shock waves.' We were just standing there whistling, 'Whew... that's interesting.' Gradually, the announcements got worse and worse until we heard 'Flight deck is contaminated. All personnel on flight deck report to the following bulkheads.' We panicked. And trying to find these bulkheads is impossible unless you've built the ship. We discovered that all the doors leading back into the ship were locked. We actually believed that we had been caught filming a movie during a real life nuclear attack! We thought we were all contaminated. As it turned out, it was just a routine general quarters drill with a sneak nuclear attack thrown in for a bit of extra flair."

After eight months aboard ship, Douglas departed. The film was assembled and released across the country during the late summer. Douglas is pleased with the finished results. "It's a pretty enjoyable two hours," he says modestly. "It's not a heavy movie. It wasn't designed to drag you into a lot of the heavy philosophical overtones that time travel connotes; you know, the paradoxes involved in changing history. We deal with all that, but very specifically. We didn't go after the hard science crowd with this."

"The time storm, for instance, was put together optically by Maurice Binder, who did many of the James Bond opening credit scenes. It's a black hole concept but with a lot of reaching into the big black hat and pulling out magical elements along the way. That's justified because you really have to use your imagination to accept the premise."

The first-time producer who managed to talk the Navy into allowing him to use the world's largest nuclear-powered aircraft carrier as a sound stage reflects on the subject of imagination. "If you're willing to believe in this movie," he says rather symbolically, "it will really pay off for you."

Night/Light

(continued from page 49)

a high school gymnasium or a college stage, anywhere, the real problem is that you have really bad lighting. So no matter how beautiful the set that you designed is, the light is absolutely terrible and it destroys the set. So I designed a set that was only light."

June Anderson was a dancer in that company. "At that time," she recalls, "Jim had already been working with light sculpture, and he had a couple of ideas for light and movement. We began to experiment with that. We worked on just the ideas for about a year and then I put together a group of six dancers and we started working towards a performance using a couple of the different kinds of light: chemical light and fluorescent light." A dancer would wave around a small tube of glowing green liquid and, silhouetted by a light strapped to her back, would become a moving piece of light sculpture.

That was in the beginning. Now, Pelletier and Anderson are using an increasingly wide variety of effects and new technologies in their performances, from simple colored gels to the more sophisticated LED lights. "We're always looking for new material," Jim says. "Right now, 90 percent of our inventory is ready made. We started out pretty much with industrial products and adapted them for our visual intent. We're now in the process of going into custom made lighting effects for the costumes and the sets."

He elaborates, "They've come out with this thing called a cordless hand drill, and its range is from 250 rpms to 750 rpms. Handheld drill, with no plug—you just hold it. So one thing we've designed is: At the end of this drill is a long tube connected to a rod, so it looks like a big T, and at each end of the rod is an LED. When you pull the trigger and the drill spins, you get this really beautiful circle. It's a different quality. The line of the light is really streamlined; it's a really fine line of light and it's constant and it's equidistant. But that drill costs \$100. So if you have six dancers, it really becomes very expensive. So what we really are trying to do now is hunt down people who have the expertise."

June Anderson agrees. "One of our big challenges is starting to work with these basic ideas and getting materials in crude forms. And now trying to make costumes that are streamlined and very lightweight so that they don't restrict movement." She grins. "If you want the dancer to be a comet, they have to be able to dash across the stage. They can't lumber across."

"When these people are dancing, they have little lights on their bodies. What we used originally were these penlights which were actually attached onto the leotards. From a distance, the figures looked just like beautiful skeletons of stars. The costumes worked beautifully from a distance, but they're bulky and it's very hard to keep these things really tightly attached onto the body. So what we're working on now is getting out costumes made using just the little bulb, and the whole

costume wired to one battery. Right now there are tremendous advances being made in the field of light and battery power."

"There's a real shift taking place in energy storage," Pelletier enthuses. "To me this is incredible. I'm amazed every time I go to a photography supply store. The batteries are getting smaller and smaller and smaller. I found a 12½ volt battery that was half the size of a deviled egg! I'm sure within a very short time you'll be able to buy battery chips, where it'll be just a little tiny thing. And that'll be fantastic for the dancer, because then it'll be pure dynamic dancing in darkness with light. And that's going to be something special."

With the help of technical director Anthony Marini and percussionist Mark Blandori, the Moondance company has been giving performances since February, 1979; their most recent being an outdoor show at Bruce Park Pond in Greenwich, Connecticut on August 30th. Interestingly enough, while the dancers depend on modern technology to create an effect, both Pelletier and Anderson feel that the effect is not essentially "high tech."

"High technology, to me, generally refers to industrial technology," explains Jim. "It's technology that is closest to science. Science is like a pure, invisible, abstract physics world and its physical manifestation is technology. High technology would be its closest relationship to science; the way art is invisible, but its closest manifestation is the plastic form of ideas. It's the material translation of ideas into reality. So, in terms of technology, I see Moondance as being mythology made possible by technology."

"It's very poetic in nature," June adds. "The imagery is all from the night sky and water. It is quite meditative in many ways. There are, of course, different sections with different types of dynamic movements. But the idea of creating characters, each one with a specific kind of spirit and a specific kind of feeling, is one thing we're very, very interested in."

"For example, our silhouette characters have a very stark imagery, and the image to me is very much of the Moon, with how the light passes across the surface, and it goes from darkness into light, and the idea of seasons, change... And the star creatures section is very joyous and humorous in a way," she says.

"The interesting thing is that when you have darkness as your format you can choose what you want people to see and not to see. So that you can make magical things occur just by bringing the lights on or off."

"That's something that really is a reigning characteristic of a Moondance performance," says Pelletier. "In *Star Wars* or any film, they can always mask things out and do overlays and put a computer track on the camera and make the camera do the thing. We're dealing with a live audience and creating a special sequence of images and magical things. So it's not like 'Well, maybe they did this or that.' It's like Disneyland: 'How do those guys do that?'"



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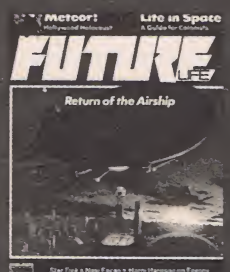
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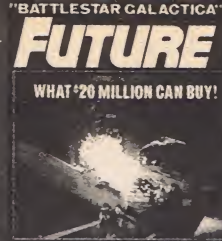
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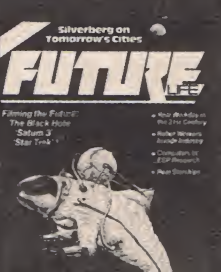
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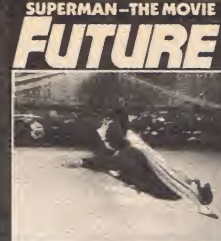
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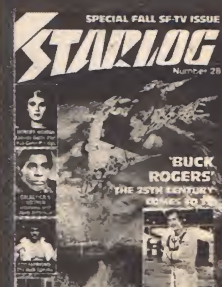
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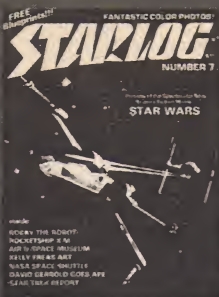
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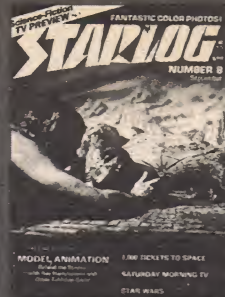
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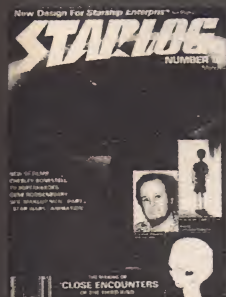
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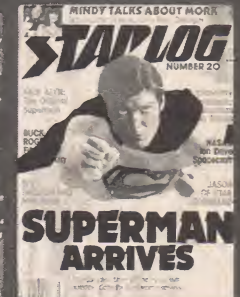
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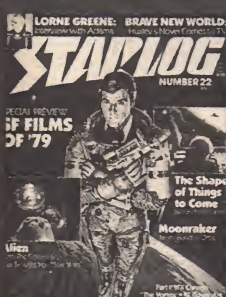
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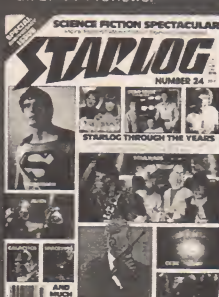
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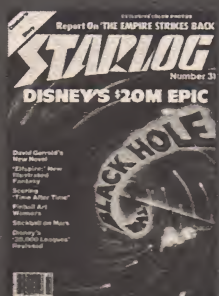
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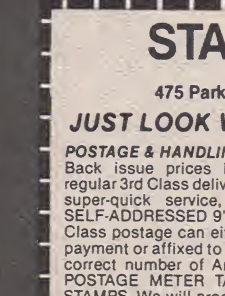
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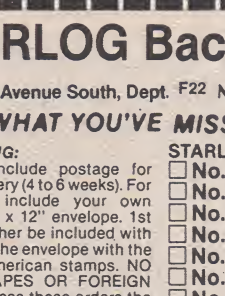
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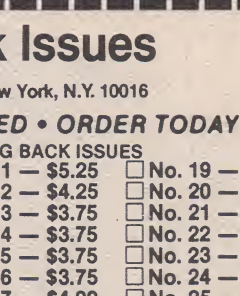
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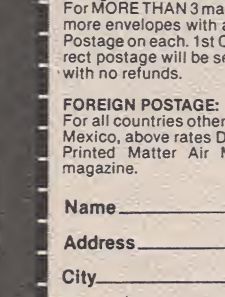
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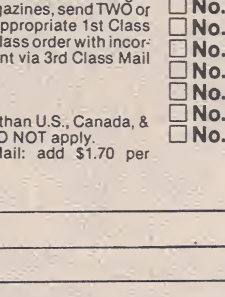
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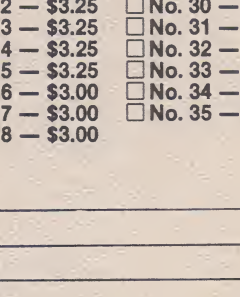
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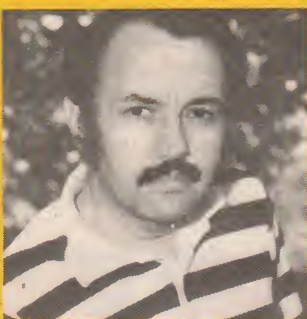
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Ron Goulart says: *I was born in Berkeley, California, 47 long years ago. I first became interested in scientific speculation in around 1940, when I bought my first copy of Action Comics and began to wonder if Clark Kent ever used his X-ray eyes to watch Lois Lane undress. Eventually graduating to the works of Sax Rohmer, A. Merritt and Edgar Rice Burroughs (with whom I used to exchange Christmas cards), I decided to become a science fiction writer myself. It took me several years and it wasn't until I was 19, and on the brink of being tossed out of the University of California for editing a smutty and leftwing humor magazine, that I sold my first SF yarn. That was to Fantasy & Science Fiction, which happened to be the only SF magazine being edited in Berkeley at the time. I next devoted a dozen or so years, in both San Francisco and Hollywood, to being an advertising copywriter. One of the side effects of which was a permanent stunting of my prose. Since 1968 I have been a fulltime freelancer and do well enough to nearly pass for a regular Connecticut commuter. Asimov has called me, "a master of wild, humorous science fiction," and Martin Amis thinks I'm the "natural heir" to Vonnegut. Thus far I've turned out roughly 35 books in the field. Most recent of which are Cowboy Heaven, Hail Hibbler and Empire 99. I remain the only SF writer ever to win a Mystery Writers of America Edgar award for an SF novel and one of the few of my age who has had only one wife. My favorite recreation is short distance running.*



The Future of Everything

The first major challenge faced by the recent Boca Raton International Worldwide Conference on the State of the Future and Related Matters was how to fit their name on the souvenir pennants to be sold in the parking lots. That problem was eventually solved, utilizing the latest innovations in teenie weenie typography, and the challenging and provocative three day conclave was ready to roll. The most respected scientists, researchers, scholars, medical men, industrialists and futurists flocked from all over the globe to the impressive new South East Florida Convention Center to partake of and participate in a series of symposiums and lectures which would pretty much answer just about every question we might have as to what the future has in store for us. It was my distinct privilege, even though I got stuck with paying my way both there and back, to attend this monumental gathering as an accredited reporter for this magazine. I had to pick up the tab for most of my meals, too. What follows is a report on the many exciting highlights of this mindexpanding conclave.

The announcement of the opening topic sent ripples of anticipation through the large and attentive audience in the spacious Main Auditorium. It was the Future of Artificial Life and the initial speaker was Gus Bremmer, president of the Two Ex-GIs Discount Genetic Warehouse. Bremmer devoted his time to recounting his company's unfortunate experiences in developing a bacterium which can eat up oceanic oil spills. "We forgot to teach the little buggers to swim," he ruefully admitted, "and they all drowned in

the Gulf of Mexico on their maiden assignment."

Somewhat more controversial was the report presented by Dr. Warren N. Solem of the Acme Research Corporation. Taking advantage of the recent Supreme Court rulings regarding the patenting of artificial life forms, Acme has somehow been able to obtain a copyright on Irishmen. "From here on out," Solem told us, "all Irishmen turned out in the United States will come from our Dearborn plant." Very zealous about infringements, Ajax has already successfully sued a Mrs. Kathleen O'Malley for producing a bootleg Irishman.

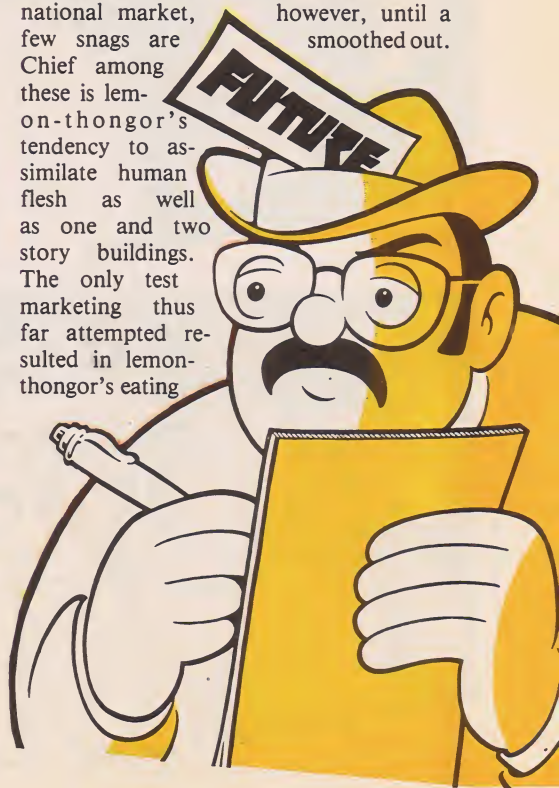
A standing ovation greeted the next speaker, the venerable Dr. Victor Frankenstein. The frail old artificial life pioneer was preoccupied with all the litigation he's involved in. Several European cemeteries contend that, because materials used in his work originated with them, they deserve a percentage of the profits from his recent creations. He also mentioned, a bit sadly, that his original monster is now in public domain.

Next we learned that several of the most anxiously awaited reports had been scratched at the last moment. Dr. Reiser, who was to report on the Future of Immunology, was home with the flu; Professor Arends was unable, because of the theft of his automobile, to drive over and deliver his speech on the Future of Crime Prevention; Andrew Bellwether phoned to say he'd be unable to appear and give his lecture on the Future of Telepathic Communication; Professor W. Emerson cancelled his paper on the Future of the Economy when he discov-

ered he'd lost all his traveler's checks and decided to cut his stay short; Professor Hedge, scheduled to speak on the Future of Immortality, died the day before the conference began.

One of the most stimulating sections of the 72-hour nonstop session was that which was devoted to the Future of Food. The leadoff speaker was Lloyd "Woody" Flennigen, Executive Vice President of the Lumberjack Bread Company. Lumberjack is an innovative new high-fiber bread made of sawdust. The enthusiastic Flennigen listed several distinct advantages of his product over more conventional flour-based products. "For one thing it floats," he told his audience. "And with Lumberjack Bread you also have all kinds of new uses for leftovers. You can use them for fuel or even making simple furniture." Questioned from the floor about the presence of controversial additives in his bread, the Lumberjack executive replied, "Actually we have less than oldfashioned bread products. We do, I admit, have to include phelonion nitrate, but that's only to keep Spanish moss from forming on the shady side of each loaf. There is also, as some busybody consumer advocates have complained, diphosgene in the packaging. But that's there solely to discourage termites."

An equally fascinating speaker followed, Professor D.W. Bascom of the Chemical Feast Dessert Company. His most appetizing-sounding new dessert was a 100 percent synthetic gelatin called lemon-thongor. This tempting dessert will be kept off the national market, however, until a few snags are smoothed out. Chief among these is lemon-thongor's tendency to assimilate human flesh as well as one and two story buildings. The only test marketing thus far attempted resulted in lemon-thongor's eating



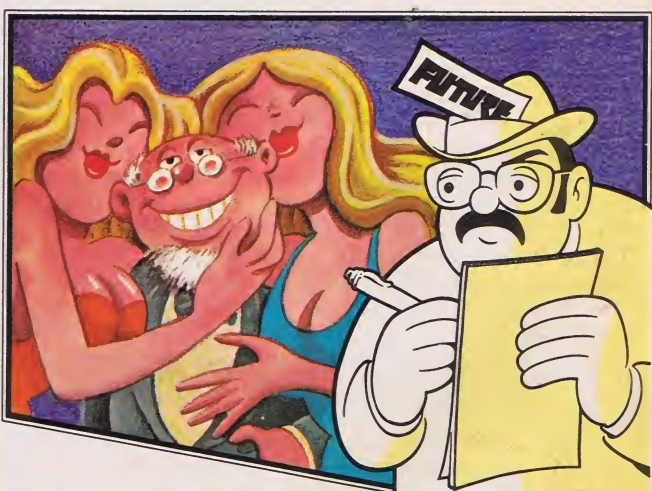
up three small towns in central Iowa. Bascom concluded by apologizing for not being able, as the program promised, to pass out samples of their new imitation ice cream. "It's because of narrow-minded government regulations," he told us. "First off we weren't allowed to call the stuff ice cream, then they told us we couldn't even call it ice milk. In fact, after the FDA tested the product and studied our ingredient and additive list, they

ruled we'd have to call it Ice Paint."

Next came a stimulating short film, produced by the Bring 'Em Back Alive Vegetable Company and devoted to their recently discovered man-eating cocoyam. "We feel that with the man-eating cocoyam we're adding something usually missing in the average vegetarian diet," explained the narration. "That's the excitement of the hunt. With this highly nutritious vegetable there's

always a question of eating it before it eats you." This challenging new food may not show up in our supermarkets immediately, since in most laboratory tests thus far, "the cocoyams have been winning roughly two out of three encounters with test humans. A figure the FDA feels is a shade high."

As provocative as most of the conference was we might as well admit right here that there were a few reports which were of lim-



ited interest even to the most dedicated of futurists. Among these I'd have to list the Future of Zippers, the Future of Harlan Ellison Scholarship, the Future of Sewage, the Future of the Elbow and the Future of Arnold M. Bayliss of 62 Chestnut Rd, Newington, Connecticut.

Another eagerly attended session was that devoted to the Future of Energy. But the anxious audience was rudely disappointed

when the long anticipated synthetic fuel pill demonstrated by its inventor Dr. Richard O'Brien produced not a half liter of gasoline when added to water but instead a glass of Alka Seltzer. The doctor admitted that he had done most of his research on the fuel pill while suffering from "one helluva hangover," which probably accounted for the mixup.

The paper on Lunar Energy, originally to have been delivered by Dr. Rheinold Googins of the New Haven Alternate Energies Institute, was read in his absence by his Chief Lab Assistant, Miss South Norwalk of 1977. Googins' innovative experiments have pretty definitely determined that moonlight is an as yet untapped source of vitally needed energy. Unfortunately the best lunar collectors thus far turn out to be hubcaps from 1976 Datsuns. As a result of over enthusiastically collecting them, his entire staff is at the moment in the Danbury State Prison. Due to some entirely unrelated experimentation with a Union Trust Company 24-hour teller, Dr. Googins himself is presently hiding in the foothills of Guaymas, Mexico.

Also somewhat disappointing was the presentation of Professor Walter Winchell Thompson of the International Spudnut Corporation. Thompson has spent the past eleven years developing a synthetic motor fuel from potato alcohol. According to the professor he has been able to get 40 miles to the gallon in his test car. He had intended to drive the vehicle to the conference, but when he went out to the garage that morning he discovered that potato bugs had eaten his engine.

There was little time given this year to the Future of Contact With Aliens From Other Planets and the only speaker on the topic was Dr. Amos Heibeck. The doctor admitted that his earlier and highly publicized claims that extraterrestrial invaders moved among us in the guise of voluptuous blonde ladies were fabrications designed mostly to get him off the hook with his most recent wife. "Real flying saucer aliens are little scaly green creatures,"

Heibeck explained. "But who'd want to get caught in a motel room with somebody like that?"

Next came an absorbing demonstration of the Future of Matter Transmission by

William F. Norgan of the CalTeleport Institute. Mr. Norgan successfully sent a construction brick to Ft. Lauderdale and back with his somewhat bulky matter transmitter. Unluckily, he then stumbled onto his teleport platform himself and disappeared with an odd popping sound. His exact whereabouts at present remains a puzzle, but perhaps when the Japanese fisherman who materialized in his place can be taught

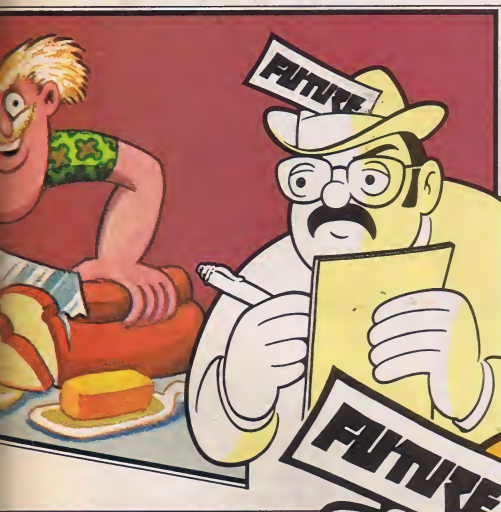
"Moonlight is an as yet untapped source of vitally needed energy. Unfortunately, the best lunar collectors turn out to be hubcaps from 1976 Datsuns..."

English some useful information will be garnered.

Another equally interesting paper was that presented by Dr. Norman Sussman on the Future of Microminiaturization. Only three and a half inches high himself, due to a work related mishap, Dr. Sussman held his audience spellbound as he stretched up to the microphone and chirped out details of some marvelous breakthroughs in his special field. Most startling was the news of the successful transistorizing of animals. "Why, we made a dog so small that he has to use a magnifying glass to find his fleas," said Dr. Sussman. Noted for his puckish sense of humor, the doctor then proceeded to do fifteen minutes of he-was-so-small-that jokes. These left his audience limp with merriment, but did little to enlighten us.

Always inspiring is Professor Jorge Cruz of the CalSouth Space Life Lab and his talk this year on the Future of Space Colonies was certainly no exception. He discussed some of the new space colonies his organization is in the process of developing. In order to lure a middle class clientele into living in space, CSSLL is going to be offering colonies in California Ranch Style, New England Saltbox and Swiss Chalet. There's also a possibility of adding Texas Bordello to the list of choices. The space shuttles to take the suburbanites to their new homes, the professor added, are being designed to include a bar car.

The conference came to an end on a rather glum note with the delivery of the final paper, the Future of Mankind, by the noted scientist, Dr. Richard Baskerville of the Strand Foundation. According to Dr. Baskerville, all human life on Earth will end in about three weeks from now when a gigantic meteor strikes our planet. Asked if he couldn't be more optimistic, the doctor replied, "Okay, make that four weeks." ▢



Space Activists

(continued from page 25)

constituencies outside the already converted—constituencies such as the elderly, the environmentalists, and others, to form alliances and coalitions to act on issues of common interest. In so doing, they are beginning to use effective direct-marketing techniques to target their message to different sympathetic audiences. Examples are the Planetary Society and the two political action committees.

But perhaps the most fundamental change is that of strategy: the trend toward greater political activity. Space interest groups are composed primarily of scientists and science-fiction fans. Space leaders have in general come from the scientific or intellectual community. According to Brigitte Rousen, in her article "Little Lobbying to Stop Space, Science Cuts" in the *Congressional Quarterly* for April 12, 1980, "The scientific community tends to spurn traditional lobbying tactics. One NASA spokesman said that scientists are more likely to produce studies than call a congressman." Many of the environmentalist leaders, however, came from the civil rights movement and the anti-Vietnam war efforts, and were therefore experienced in politics when they took up the environmental cause. In the citizen-support space-interest groups, that traditional shyness and aversion to political involvement is beginning to change, as evidenced by the special "political action" session at the spring meeting of the American Astronautical Society, and the formation of the first citizen space political action committees. Chafer observes: "The space movement is desperately looking for a way to be effective. People are tired of paying for newsletters—and are now establishing ways of efficiently influencing public policy." In the words of one LS Society member at the AAS: "Like it or not, space policy is made on the floor of Congress, and if we want something to happen, we have to go there too and fight for it."

Is there a nascent space interest movement? If the signs of the past year or two are evidence of a genuine trend, it does seem as though one is growing, is coalescing, is strengthening, and is politically wising up, particularly at the grass-roots level. In fact, all of the signs indicate that by the mid-1980s an American space-interest movement *could* be as powerful as some of the major special-interest movements existing today.

During interviews I heard with almost uncanny frequency statements like, "Space supporters form the largest single constituency in America, cutting across all kinds of traditional barriers—only it's silent and unfocused." Following close on its heels was a second recurring concern, perhaps best phrased by Barbara Evans of the Space Studies Institute: "There is a sense of determination to get our acts together *now*. When the shuttle is launched in 1981, space will once again become *real* to the American public—and we want to be prepared."

Time alone will tell.



next issue



DOLLARS AND SENSE OF SPACE

While most FUTURE LIFE readers feel that it is essential for us to make the leap into space, there are still many less starstruck people out there who are not quite as convinced. After all, wouldn't the funds be better spent solving problems here on Earth? In "Space: Is It Worth It?" science writer Trudy E. Bell takes a close look at the arguments against the U.S. space program. Why did we go to the Moon? How much of our money is *really* being spent on NASA? What improvement has the space program brought to our lives and what could it bring us in the future?



VIDEO FROM UTOPIA

Todd Rundgren is a multi-faceted artist best known for his musical excursions with his band Utopia. But Rundgren doesn't content himself with taking the music world by storm; now he's ensconced in fascinating video projects in production at his state-of-the-art television studio, Utopia Video. He's completed one half of a video tour de force based on Tomita's *The Planets*, and the other half is now underway. In the next issue of FUTURE LIFE, Todd Rundgren previews his video projects and reveals his views on future fusions of music and the visual arts taking shape at Utopia Video.



FUTURE FLIGHT

Small may be beautiful in some pockets of the future, but tomorrow's airways are likely to be populated with ever larger vehicles. Continually rising jet fuel prices are encouraging aircraft designers to look for ways to get more off the ground for the money. Incorporating technology advances in the areas of materials, avionics and alternative fuels, researchers for NASA and the Air Force are looking at a variety of shapes that could be taken for future flight: nuclear powered aircraft, hydrogen fueled planes...even the "flying wing" is being revived. FUTURE LIFE flies into tomorrow with an illustrated survey of advanced aircraft concepts.



SPINRAD SPEAKS OUT

Norman Spinrad, author of *Bug Jack Barron* and *A World Between*, can definitely be called one of the untraditional members of the science fiction community. After all, how many writers have had the dubious distinction of being denounced as a degenerate on the floor of the British Parliament? Next issue, the controversial author—and current president of the Science Fiction Writers of America—gives his opinions on a myriad of topics, including instantaneous media elections, the possibilities of fusion power and psychoactive drugs.

PLUS

An art preview of *Starhunt*, an upcoming film production based on David Gerrold's popular science fiction novel... The eclectic art of Ron Cobb, designer and illustrator on such films as *Star Wars*, *Alien* and the upcoming *Conan*... Musings on music and technology from new wave band Devo... A futuristic fashion show featuring the costumes of space spectacular *Flash Gordon*... plus Harlan Ellison, Alternate Space and Earth Control views, book reviews, Databank news and space scenes by Gallery artist Robert J. Rich.

FUTURE LIFE #23

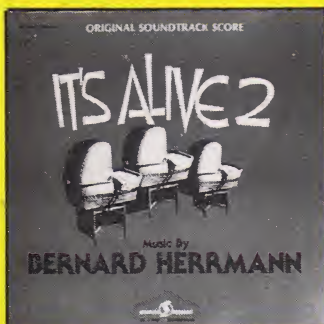
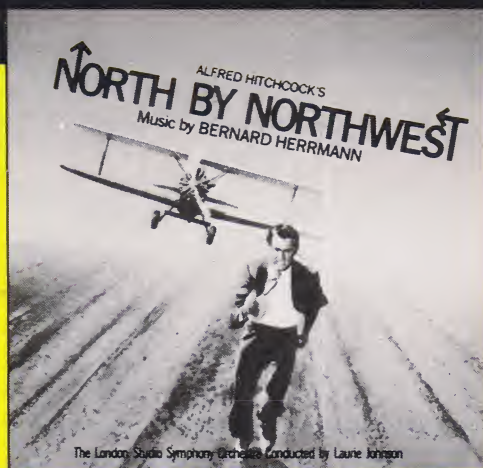
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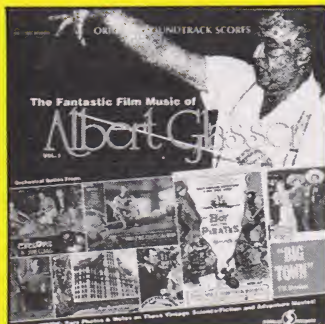
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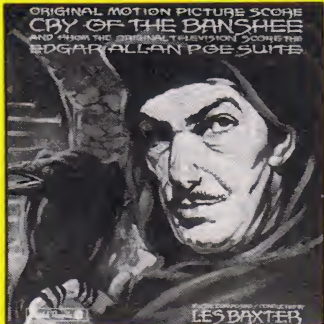
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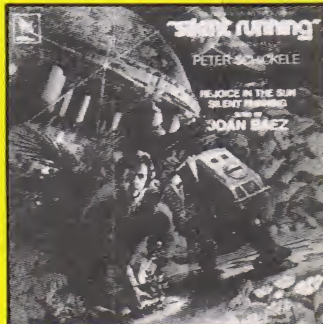
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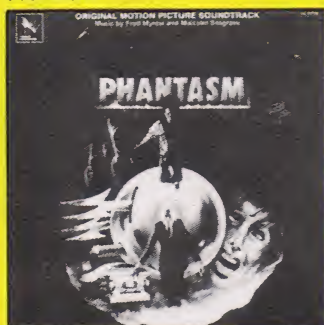
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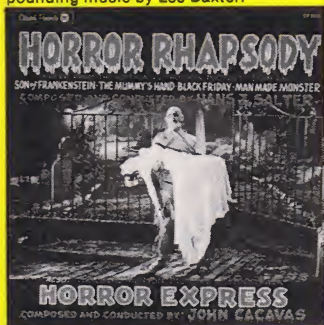
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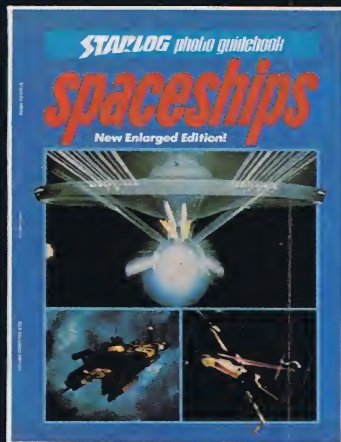
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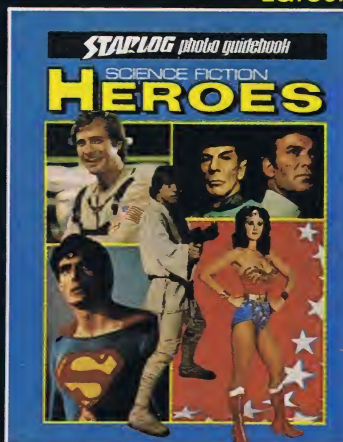
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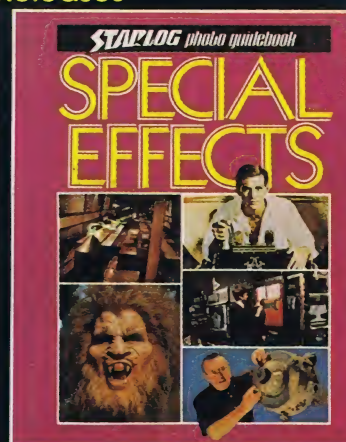
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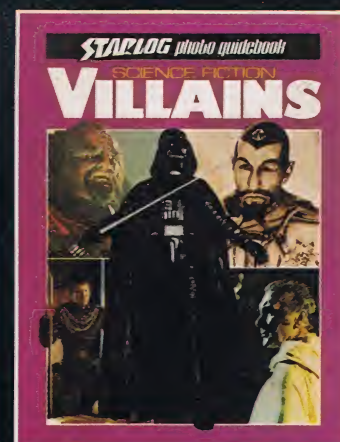
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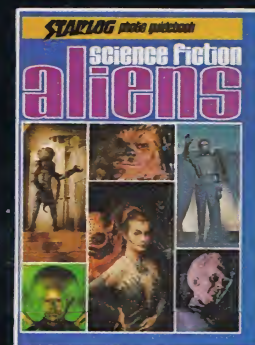
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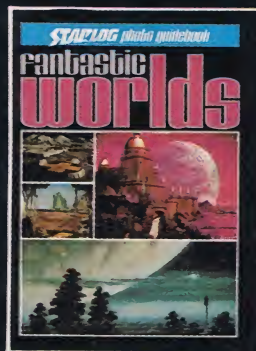
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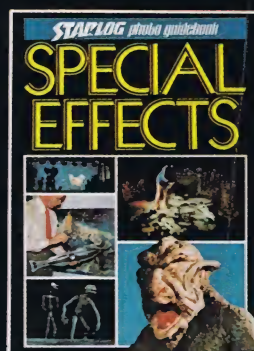
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